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VOL. XXXI February, 1949 No. 1, Part 1

COMING READJUSTMENTS IN AGRICULTURE—DOMESTIC PHASES*

JOHN D. BLACK
Harvard University

THE occasion calls for a reversal of the usual order in analysis of futurities and for viewing the long-range impending developments before the short-range ones. In fact, very little of the analysis following assumes a time-span of less than thirty years. In this long-range analysis, a world viewpoint is needed, and hence some attention to international relationships, but this will be kept at a minimum to avoid encroachment on the other half of this program. A further assumption is that the world will escape another war within the span of years taken.

The primary long-range factor in future agricultural development is the balance of population growth and food-fibre supply, and this will receive major attention in this paper. The public has been stampeded in the last year or two into a frenzy of wild talk about a world threatened with starvation because the world's population is increasing faster than the food supply. We have been warned that the world's population is now increasing at the rate of twenty million a year. Mr. Norris Dodd of the FAO has said that somewhere in the world 57,000 new mouths are sitting down to breakfast each morning. One frantic writer believes that the situation is so urgent that converting a sizable fraction of the human males into eunuchs is a reasonable solution of it.[1]

* A paper presented at a joint meeting of the American Economic Association and the American Farm Economic Association at Cleveland, Ohio, December 30, 1948.

[1] The latest example of this is the burst of Sir Hartley Shawcross, Britain's attorney-general, that made the front page in the *New York Times* December 19. One can understand why the British, thinking rationally, although in the short-run, would like to see food as cheap again as it was most of the time from 1921 to 1940. But this does not fully account for the British attitude on this subject. If we in the United States had lived through the world war and since on the same diets as the British, and much of the time in fear that next month might bring actual starvation, we might very well be in the same morbid state of mind on the subject of food.

So far as I have observed, no social scientist with repute among authentic social scientists has been drawn into this stampede. It will be remembered by many of you that it was a biologist who did the principal alarming after the first World War, my former Harvard Colleague, Edward Murray East, in his "Mankind at the Crossroads." The alarmists this time are either biologists or men who think more like biologists than they do like social scientists. Basically, they think of the human race as an immense drove of hogs feeding out of one big common trough. They may deny this when you face them with it, but it nevertheless underlies and predetermines all their thinking.

The social scientist approaches this problem like all others in terms of existent or potential social units or aggregates. For some phases of the population-food supply relationship, the nation is the appropriate aggregate; for others, groups of nations in one trading bloc; for others, on the other hand, segments of nations, such as our own South, or the Maritime provinces of Canada. For certain aspects of this problem, the aggregate will be as small as the group of Spanish-Americans living in the upper Rio Grande Valley of New Mexico. In analyzing the relationship of population to food supply, the underlying issue in the social scientist's approach is whether, for any one such social aggregate, *the rate of improvement in the arts is as fast as, or faster, than the rate of population increase.* If the rate for the arts is faster than that for the population, standards of living are sure to be rising, except that temporarily, as in Russia in some recent decades, and in much of Europe at this stage, the gains may be diverted to capital formation.

The arts in any such balancing are not merely the agricultural arts. For a nation to increase its aggregate or per-capita industrial output so as to be able to import more food may be as effective as to increase its food-fibre output per worker on its farms; and likewise to improve its transport facilities so as to handle food and other products more effectively.

It is entirely possible, however, that the inability of a social aggregate to increase much its output of food or fibre per worker because of limited available land resources, is the major factor conditioning the rate of increase in the arts and rise in the standard of living. This was apparently the situation in the United States and Western Europe in the early years of the present century. Prices of food and fibres rose more rapidly than of most other

products from around 1900 to around 1920. There is considerable evidence that the turn would have come as early as 1915–16 except for the first world war. From 1920 to the second world war, the arts of food and fibre production kept fully up with, and surely exceeded in some years, the arts in the rest of the economies of this group of nations.

We need to get more clearly in mind the social aggregate that we are talking about in the foregoing. It actually includes more than the United States and Western Europe. Although it is most conveniently called "The Western Trading Bloc," it really includes all the exporting countries that supply Western Europe with food and fibre in sizable volume.

For population and food-supply analysis, however, it is not sufficient to define such aggregate solely in terms of exchange of goods—exchange of populations also enters into it. Europe may accept the sugar, rubber and tea of the East Indies and Southeast Asia; but it does not accept its peoples as immigrants. Consequently these Eastern countries have to work out by themselves, in the main, their own balances of increases in the arts and increases in population. They are not part of the same social aggregate so far as population relationships are involved, as are Western Europe, the United States, Canada, Latin America, Australia, New Zealand and South Africa.

What happens, it follows, to the balance of population and food supply in India or China, to be specific, has very little direct bearing on that balance in the United States, or in France, or Sweden, or even the United Kingdom. There may come a time when exchange of foods and other products and of populations, between North America or Western Europe and the Far East, will be free enough so that the balance of rates in increase in the arts and in population in one of this pair figures importantly in standards of living in the other. But that day is still far removed. Efforts of FAO and the other units in the United Nations should be directed toward hastening that day, but other more important objects must not be sacrificed for this one.

As for the general argument that the countries with good diets should share their food with the peoples of the densely populated regions, one has only to point out that if they had done this in the past three hundred years, most of them would now be down close to the Malthusian level of subsistence. The hope of the world is in

the countries that have escaped such a fate and that can now help the rest of the world to escape from it. And if these fortunate countries are not to dissipate their precious chance to help, they must guard carefully against measures that may seem helpful on the surface but in the end will only drag them down toward the Malthusian level. And the Malthusian countries must guard equally carefully against permitting such mistakes to be made ostensibly in their behalf.

How much of the world is already at the stage where its arts are advancing faster than its population? Our Chairman, Howard Tolley, considered this point in a paper read before the American Academy of the Advancement of Science in December 1946, recently published in a Symposium "Freedom From Want,"[2] and concluded that only forty per cent of the earth's human population is now living in countries which on the average have reached this stage. The progress of humanity toward a goal of food enough for all, it is pointed out in another paper in this same symposium, is measured by the number and size of the population groups that are added to this forty per cent. The forty per cent which Mr. Tolley mentioned will become fifty percent in a few decades, then 60 percent, etc. How long before countries like China and India will start on their way toward their optima? They, as a matter of fact, probably have but one direction in which to go. They probably are already close to their lowest possible limit. But they are likely to rise from this level rather slowly at the start—even if they make mighty strides in agricultural technology and industrialization. The gains for a few decades will mainly take the form of less disease and misery, and longer, healthier lives. The accompanying rise in the ratio of production to maintenance rations in their diets will presently, however, begin to manifest itself in rising levels of living, and this in a few decades in declining birthrates. Unless this stage is presently reached, the gains will be lost and the countries will start backwards and downwards again away from their optima.

It follows from the foregoing that each country must work out a solution for itself along the lines indicated. No country can do it for another. Such a statement is wholly in keeping with the pronouncements of the Hot Springs Conference on Food and Agriculture. Number one of these pronouncements was that enough food

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[2] P. 218 ff., Vol. 11, No. 4, *Chronica Botanica*, Waltham, Mass.

can be produced in the world to give all peoples the food they need for health and working efficiency. Number two was that the task of doing this is the responsibility of each nation. Number three was that the task can be done more effectively, however, if the nations help each other to do it.

The reader may be objecting at this point to putting all of western Europe in one social aggregate, and all of Latin America. What about Spain's progress in the arts? and Puerto Rico's? Logically there is no difference between grouping these with the rest of Europe and of North America, and considering the United States or Canada as all one aggregate. Spain, like the South within the United States, and Quebec within Canada, is a sub-aggregate within a larger one. The sub-aggregates work out their own balances between population growth and the arts more or less as do nations or groups of nations. Generally, however, the institutional concomitants are different. Thus exchange of food and other products is almost certain to be freer within a nation than among nations; and more important, population movements are freer. As long, however, as important differences in man-land ratios, in outputs per worker, and in levels of living, persist among provinces or regions within a country, separate social sub-aggregates exist.

The foregoing suggests the query as to how progress in the population-food-supply balance occurs within such aggregates. The answer is that generally it does not take the form of raising the average level of the whole group at one time. Instead it mainly takes the form of accretions to the groups of families that have already been able to raise their levels of living by keeping the numbers in their families adjusted to their abilities to feed, clothe and educate them. Even the so-called Malthusian countries have considerable blocks of families that have made this adjustment. These blocks are expanding. Sometimes, however, progress in this direction is greatly aided in particular areas by a sudden increase in output and earnings arising from new industries, land developments, technologies and the like. Commonly in such situations only part of the families sink all their gains in the feeding of more mouths. Also out-migration from a region can be large enough to help importantly—it was in the case of Ireland, Norway and other countries of Europe in the 19th century. Ordinarily, however, it helps much the families that migrate and very little those left behind.

At this point, it will be wise to stop and deal briefly with a correlative aspect of threatened world starvation—namely, the threat of "continents sliding into the sea." We are also being told by some that this country has already lost a fourth of its "irreplaceable" topsoil, and hence, by implication, a fourth of its potential ability to feed its people. Such writing and talking puts the informed social scientist of this country in an unhappy position. He knows full well that this country has carried the exploitation of much of its farm lands too far, and that not to replace these exploitative methods with methods that will maintain the soils at a good level of productivity, and do this rapidly over the next few decades, is very poor economy. He therefore does not want to say or do anything that will make the efforts of the conservationists less effective. Still, he is obliged to say when he meets with his fellow social scientists, as on this occasion, that neither the people of his own country nor those of Western Europe, are faced by dire hunger if they go about this more slowly. Only a minor fraction of this lost topsoil is irreplaceable. Much of it could be replaced in five or ten years. But not without losses in yields and sizable direct outlays on fertilizer, seed, etc. It is far better economy to farm in such a way as to keep much more of the topsoil in place and save these losses and outlays. Moreover, unless vigorous measures of this sort are taken, considerable land already seriously eroded will become so badly worn in the next two or three decades that it will have only low-order agricultural use, or perhaps only timberland use, in the half-century or more following. And of course those lands which have shallow, or sandy or gravelly, or otherwise non-tillable subsoils, can be ruined for good by prolonged erosion. Still, the balanced judgment must be that if we continue with the measures for maintaining the productivity of farm lands that are now under development in this country, most of the irretrievable losses will be prevented.

As for Western Europe, most of it has been farmed for centuries in ways that maintain a relatively high level of productivity. The strong shift toward more forage crops and livestock in the last hundred years has contributed importantly to this result.

The sensible report to make on conservation as a phase of the food-supply-population ratio is therefore that so far as the social aggregate that includes the United States and Western Europe is concerned, the management of its farm lands could easily be heed-

less enough of the future to reduce the levels of food consumption in the next fifty or one hundred years; but, barring further destructive wars, it would have to be almost unbelievably bad to lead ultimately to mass hunger. The reasonable expectation is that the management will improve rather than retrograde.

We need next to consider more specifically the part that technology and progress in the arts may play in the population food-supply relationship in our particular social aggregate. First as to the technologies of agriculture. The turning point in the race between population growth and progress in the agricultural arts that probably came around 1915–16 was the result more of the application of science and new inventions to agriculture than of pushing out the extensive margins. In some measure, these two processes supplement each other—the new technology, for example, made feasible the utilization of more semi-arid land. The limiting factor on increase in agricultural output from 1920 to 1940 was the ability of the population in our social aggregate to buy the product of our acres. In spite of the acreage controls finally adopted in 1933, total agricultural output in the United States increased 8 percent between 1933 and 1939. With the sudden new outlets created by World War II, output increased a third and still prices of food and fibres rose to their present high levels. The major part of the increased agricultural output of the years since 1939 appears to have been due to higher technical intensity of cultivation and new applications of technology. There was a very large backlog of technologies only sparingly used in 1940. My friends in the Agricultural Research Administration of the USDA tell me that there is a surprisingly larger backlog today than in 1940. Combinations of use of hybrid seed, pest control, heavier liming and fertilization, and better tillage, are producing large yield increases. It has recently been reported that 600 farmers in North Carolina have obtained corn yields of 100 bushels or more per acre in 1948. Such yields make it possible to grow all the cultivated crops needed on the level or nearly level lands. The potential gains from pasture and forage improvements are the most important of all. The possible gains in livestock production are mainly from such things as artificial insemination, and feeding at rates that reduce the proportion of the feed going into maintenance. Finally, new engineering developments are making feasible the conversion to more intensive use of much land formerly considered too dry, too wet, too subject to

floods, too stony, too rough, or covered with brush. Outlets, and accompanying prices, will again be the limiting factor in expansion of agricultural production. Except for the incidence of a period of subnormal rainfall, such as 1931–36, outlets will begin seriously to limit agricultural expansion in the United States as early as 1950–51. This will be true with or without crop-control measures.

What will be the impact of mechanization on these developments? Family economic units will become larger. Many small uneconomic units will be absorbed into neighboring farms. Proportionately fewer workers will produce the food and fibre for a population still more urban occupationally. Farm incomes will rise per farm and per worker, even though prices of farm products are likely to decline relatively over the next few decades, at least of those products that lend themselves to mechanization.

The nations of Europe will no doubt strive to become more self-sufficient in food in the next decade or two. Part of them can increase yields considerably by a freer use of commercial fertilizer than before the war and by adopting the newer technologies of breeding and pest control. Surely, for example, corn hybrids can be developed that are adapted to the climates of southern Europe. That land developments are still possible in limited measure is illustrated by the plans under way to convert to good pasture land the heather- and bracken-covered moors of the British Isles.

If self-sufficiency had been the sole object, Western Europe could have achieved this in the 1930's simply by shifting about 3 percent of its land used to grow feed for livestock to growing cereal and root crops for direct human consumption. This kind of self-sufficiency is within the reach of Western Europe within a very few years. To attain diets with prewar levels of meat, dairy products and eggs may take eight or ten years.

Let us now consider briefly the relation to the foregoing of technological progress outside of agriculture. There can be no doubt that larger outputs per worker in industry and trade provide buying power for more farm products, and more actual spending for food. If the average consuming unit in the United States had consumed the same food in 1948 as in 1935–39, it would have devoted 21 percent of its disposable income to food. It actually devoted 28 percent of it to food. Its income had increased 2.8 times; its food expenditure 3.0 times. The general price level had risen 2.0 times; retail food prices, 2.2 times. The index of physical food consump-

tion now being projected for 1948 is 112 on the 1935–39 base. In its peak year, 1946, the comparable index was 118. It is commonly believed that shortages of other goods contributed to the high expenditures on food in 1945–46. The 112 is more nearly normal for current income levels.[3]

The larger real incomes of recent years have been due much more, of course, to steady employment than to technological advances. But the impact on buying power is roughly the same in either case.

It may help us to judge possible gains from technological advance in the next decade to review developments following World War I. Output per worker in manufacturing employment increased nearly a half in the deacade of the 1920's. Industry, by 1927–29 at least, found ways of paying the much higher wages that came out of the first world war, provide relatively full employment, and make large profits at the end. The gains in output per worker were of course much less than this in construction and mining, and still less in trade. To obtain its personnel, trade had more or less to meet the wage competition of other employments. It met this situation in part by raising margins—on food the rise between 1913 and 1927 was from 53 to 59 percent of the consumers' dollar. The average increase in output per worker was obviously much lower than for manufacturing alone—probably no more than a third of it. The index of per-capita physical food purchases is calculated to have risen from 96 to 102 during the decade of the 1920's.

As for the decade of the 1930's, the trends are so much obscured by the Big Depression and its aftermath, and by several institutional adjustments, such as in the shortening of the work week, that little more than conjecture is possible. By 1938–40, labor in industry, when employed, was appreciably more productive per hour than in 1928–30, and even a little more per work-week. Food margins had risen to 61 percent of the consumers' dollar. The index of per-capita food consumption had risen to 104 by 1939.

A simple projection of the gains in per-capita income and in food consumption of the 1920–40 decades forward to 1970 gives the results appearing in the first column of the table following. The second column combines these advances with a projected 23-percent increase in the population.

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[3] The index forecasted for 1950 in Black and Kiefer's "Future Food and Agriculture Policy" (p. 124) is 113 for "high-level" employment, and 109 for "moderate" employment.

It will be obvious from this table that the agricultural adjustment problem facing this country in the next two decades is something different than simply expanding overall food production. Little if any increase in cereals is called for, so far as domestic needs are concerned. The land to produce all the other plant products on the

1970: PERCENTAGE CHANGES FROM 1935 TO 1939 (+ OR −)[1]

Food Groups	Per-capita changes	Per-capita changes combined with population increase of 23 per cent
Cereals	−24	− 4
Potatoes	+18	+ 49
Sugar	+13	+ 42
Fats and oils	− 1	+ 25
Pulses	− 3	+ 22
Tomatoes and citrus fruits	+96	+147
Vegetables—green, leafy and yellow	+15	+ 45
Other vegetables and fruits	+28	+ 61
Eggs	+33	+ 68
Meat, poultry, and fish	+48	+ 86
Milk	+17	+ 47
Consumption index	122	150

[1] From Black and Kiefer, *Future Food and Agriculture Policy.*

list can easily be obtained. This country could increase its potato and sugar outputs five-fold if these were the foods most needed. The crucial question is whether this country can increase its feed and forage production around 65 percent over 1935–39 to provide the increase in meat, milk and eggs. The judgment of this writer is that it can, and rather easily. The livestock production of 1945–47 was already fully half way to this goal. Further increases in yields plus further land improvements, all within easy view, can supply all the feed and forage required for the increased output of meat, milk and eggs listed in the table. If progress in the industrial arts were twice that assumed in the table, the land resources of the United States would still be equal to the task.

If the population of the United States pretty much levels out after 1975 as now predicted, after that there will be only the rising level of per-capita food consumption to provide for.

A parallel analysis of Western Europe's prospects can reasonably assume a definitely slower rate of advance in industrial and related

technologies. Notestein and his Princeton associates have predicted a leveling out of population growth in Europe exclusive of Russia even earlier than in the United States. The most determinative factor in the ability of the nations of Western Europe to raise their dietary levels by including more meat, milk, and eggs, will be their ability to export industrial products and thus obtain the needed exchange with which to buy livestock feeds. Even with little improvement on this score, at least small gains should be possible in most of the countries when their populations stop growing.

The foregoing analysis has no doubt gone too far in assuming first the United States and then the Western Trading Bloc as more or less separate entities. First of all, full analysis must recognize that the people of the United States will consume more imported foods and fibres as their earnings rise. This will in turn release some foods for export. Agricultural imports may very well increase more than agricultural exports.

Second, the individual countries of Latin America present a highly varied set of conditions with respect to potential resource development, population density, and dependence upon exports and imports. This is true but in lesser measure of the countries of Western Europe. A full analysis calls for separate consideration of these countries as sub-aggregates within the larger framework here constructed.

Third, industrialization in the Far East, when and as fast as it occurs, may gradually provide a little new buying power for the foods and fibres of the countries with low man-land ratios. For the most part, the markets for the industrial products of these countries will be within their own countries. They cannot expect to invade foreign markets for industrial products in any large way.

Some one may be inclined to ask what allowance is made in the foregoing statements for the activities of FAO in promoting freer exchange of food between the exporting and deficit nations. The answer is "None." It is possible that surpluses of some products will become so large in the next three, five, or ten years that the United States and some other nations may take steps to make these available to other nations at special prices. The FAO itself has not taken any steps in this direction, although this was provided for in the Preparatory Commission's program for a world food board that was adopted at the Geneva Conference of FAO in 1947. In fact, it was one of the principal recommendations of that conference.

All of the analysis thus far is in terms of trends over the next several decades. If nothing worse, there may be one or two major booms and depressions within this time span, and surely there will be minor ones. These will produce departures from the trends in both directions, and have the general effect of retarding the rise toward higher levels of income and consumption. In terms of 1935–39 levels of food consumption, a major depression that might come around 1960 if history repeats itself could reduce food consumption to an index level of 103 per capita, or 121 allowing for an 18-percent increase in population by then. The comparable consumption index for moderate employment would be around 133–35, and for high-level employment, around 140.

It should be obvious from the foregoing that overall production and consumption of foods and fibres can easily get out of line with each other. It would be expecting almost the miraculous from our economy if aggregate food and fibre production expanded exactly in line with the growth of population and rise in buying power at home and abroad. The chances for maladjustments by individual products are much greater than for aggregates. Keeping such maladjustments from becoming too serious is the major task of those who have responsibility for the course of public and private affairs.

The first line which aids to better adjustment of production and consumption should take is supplying the entrepreneurs involved with the clearest and fullest possible information as to trends in production and consumption and current departures from these. We never have done this with anything like thoroughness and hence do not know how adequate such a program would prove to be. To be safe over the next several decades we therefore need also to try out other methods with part of our products. The last Congress introduced for the first time, to go into effect with the six basic crops on January 1, 1950, a formula device for adjusting prices according to carryovers plus the new crop. This is a very crude first design of what could be developed into an instrument that might well keep production and consumption in fair balance from year to year. What such an instrument might look like in its more developed form is suggested by the formula now in use in the Boston milkshed for adjusting milk prices. This formula includes a measure of changing demand and one of change in the prices of its two most important and most price-sensitive cost factors, and an adjustment for the changing balance of supply and demand. The

adjustments provided in the Agricultural Act of 1948 for the non-basic farm products are largely at the discretion of the Secretary of Agriculture. He would do well while he has a chance to try out carefully designed formulas like the Boston milkshed formula for a number of these products.

One step further than this is forward-pricing—that is, announcing in advance the price which it is believed will keep supply and demand in balance. Forward-pricing is likely to prove more workable if there is combined with it some provision of the sort in the Act of 1948 for adjusting the price with the size of the crop when it is harvested.

Any one of these three devices, if it is really to do the job needed, must be supplemented by provisions for storage of abnormally large outputs and also for distribution outside the usual channels of trade, the latter not just on an emergency basis, but more importantly, on a planned combined production- and consumption-adjustment basis which shifts resources into desired lines of production instead of waiting for surpluses to arise.

Unless consumption and production are kept in reasonable adjustment by such methods as these, we shall have individual producer quotas again, and very soon in the case of cotton. Applied in their prewar form, that is, based on past production, these can be exceedingly damaging to the agricultural economy. The least objectionable of such quota systems is the one which would limit the quotas to a share in the domestic demand for the product, which share would sell at whatever price it would bring in the regular domestic market, and leave the producer free to produce what he wants to for export, and more particularly for disposal outside of the usual channels of domestic and foreign trade, at a lower level of prices. One proposal is to limit the individual quotas to a fraction, perhaps a half, of the individual producer's share in the domestic market, such share being based upon a 3-year or 5-year moving average of his past production. This procedure would still retard needed adjustments in production, but probably not disastrously.

The task of maintaining good adjustment is of course made much more difficult by the short-run cyclical variations in buying power and consumption mentioned earlier. Especially do they accentuate the need for supplementary food- and fibre-distribution programs. They may also require, for practical reasons, some form of farm

income supplements. The less that these are made in cash handouts, and the more in the form of aid to needed production and consumption adjustments, the more helpful they will be.

A final brief word as to the probable direction that adjustments will need to take in several sectors of our agriculture. The Northeast is likely to see increasing relative demand for dairy products. This will induce improved pasture and forage management, more mechanization, larger family farm units, and a growing confidence in the agricultural outlook for the region. The accompanying gains in efficiency should make relatively lower prices possible. The acreage in crops will increase very little, but considerable brushy pasture will be improved.

The only changes in the Corn Belt will be a general moderate intensification of farming, achieved by use of more machinery, power, and fertilizer, rather than by the use of more labor. Still more of the smaller farms will be absorbed into fully mechanized family farms. Cultivated crops will tend to be concentrated in the more nearly level lands, and the sloping lands will go into longer rotations and under more intensive grassland management. Meat prices will decline less relatively than dairy product prices.

Farming in the Great Plains will become more diversified. Farming systems which combine crops with livestock will be pushed farther westward. More range will become pasture, and more winter forage will be grown. The region will depend less on wheat as time goes on in spite of immediate developments in the other direction.

The South will see the largest readjustments of any major part of the country. Over large sections of the South, cotton will decline to the position of an important supplementary cash crop. The core of the farming systems in these parts of the region will be the growing of forage, corn, and winter small grains and feeding these, first, to dairy cattle, second, to beef cattle, and third, to swine. The farms over large areas will go under intensive grassland management. Needless to state, accompanying these changes will be a large absorption of small farms into neighboring farms to make economic units of the type indicated for the Northeast, which will make as full use as they can of modern power equipment. The prospective changes in this direction are so great that they will not be completed in less than half a century unless private and public credit and farm planning services are provided in large measure.

In the parts of the South where cotton can be grown in fairly large fields under full mechanization, with yields of a bale per acre or more, cotton growing will not only persist, but will expand somewhat. This will also be true in the western areas with lighter rainfall and low yields lending themselves to other types of mechanization.

Vegetable and fruit growing will expand moderately, especially in the South and Far West, to provide for our growing population and larger inclusion of these foods in our diets.

Does not this brief exhibit point to the simple observation that with adjustments of this order in prospect over the next several decades, the economists working in agriculture have an unusual opportunity to be highly useful, but also to be obstructive; and this is surely true of whatever measures of public aid are adopted. Both can function, and have functioned, in both of these ways. The obstruction is most likely to come from those who think they know most about it because they have been living with it most closely.

DISCUSSION OF PROFESSOR JOHN D. BLACK'S PAPER*

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PROFESSOR BLACK with characteristic vigor, delights in calling a spade a spade. He will have no truck with the food-population rubbish that has come to shore in the backwash since the war. Those few biologists and popular writers who are commercializing on this rubbish will find Professor Black's analysis too distasteful and too rough for their neo-malthusian fiction intended to instill fear and consternation into our optimistic souls. Or is it motivated simply to acquire a bonanza from the sales of books on this topic? Professor Black's cryptic observations both on the different social aggregates in relation to food and population, and on soil conservation, are timely; they should clear the air on these issues.

In putting his case for separating the social aggregate of India, or of China, and that of the United States in analyzing the forces affecting the population-food balance, Professor Black of 1948 is quite at variance with Professor Black of 1946. As between the two, it will be apparent at once why I prefer the views that he has expressed in the present paper. At the meeting of the Farm Economic Association in Philadelphia, in 1946, in commenting on my paper, "Food, Agriculture, and Trade," Professor Black felt that I was altogether too negative in emphasizing the economic separation that exists between these populations with altogether too little food and those with virtually enough food. I stressed at that time the slow, nevertheless significant welfare contributions that could be achieved by trade and by capital movements among countries in a trading world. On all of this, Professor Black made this comment " . . . Professor Schultz's program in the international field consists, practically speaking, of relying upon such transfers . . . as may be induced by freer exchange of farm products and freer investment of capital in foreign industrial ventures, and upon the slow evolution of international institutions for stabilizing employ-

* A discussion presented at a joint meeting of the American Economic Association and the American Farm Economic Association at Cleveland, Ohio, December 30, 1948.

ment, with intervening use of such buffer arrangements as may slowly evolve. Other measures are to be set aside to give these three a chance to evolve. The FAO program, insofar as not included in the three types of measures favored, becomes a program merely of 'the extension of knowledge of nutrition,' and 'the export of technology and skills.' This reviewer is unable to look upon such a diagnosis of the situation as other than preponderantly negative."

Compare this remark of two years ago with that in the paper before us, " . . . industrialization in the Far East . . . may gradually provide a little more buying power. . . . The markets for the industrial products of these countries will be within their own countries. They cannot expect to invade foreign markets for industrial products in a big way . . . someone may be inclined to ask what allowance is made in the foregoing statements for the activities of FAO in promoting freer exchange of food between the exporting and deficit nations. The answer is, 'none'."

I realize that it is altogether too easy to get remarks of this kind out of their context. In focusing his guns on the population scares that are now current, Professor Black has taken good aim, firing from well-chosen ground. In applauding the effectiveness of his shots, I merely went to indicate that in achieving his objectives he has left altogether too little room for the international efforts of FAO or of other groups and organizations in terms of positive contributions that they can make to important aspects of the food-population problems in the world.

Let me close this review by calling attention to several subsidiary matters:

1. Professor Black expresses the belief that 1915–16 was probably the turning date when the forces increasing the supply of food overtook and outdistanced the forces increasing the demand for food in the United States. The importance of such a turning point can hardly be overrated. I feel that Professor Black's insight on this matter should be formulated as a hypothesis and put to a careful test, not so much for the purpose of ascertaining the exact date, for that is not nearly so important as determining the nature of the forces and their respective importance in the food-population mechanism of the United States.
2. Professor Black states at one point in his paper, that "Outlets, and accompanying prices, will again be the limiting factor in expansion of agricultural production."

Relative prices in any viable price economy are by definition the

apparatus that controls the allocation of resources. Accordingly, no matter how high or how low the price is under given supply and demand conditions, it establishes both the upper and lower limits to the amount of resources that will be utilized in farming. In this context, the above statement as it stands is not a meaningful proposition since it is always true by definition. My point is simply this, that some restrictions are required to give this statement meaning. I recognize that the necessary restrictions are implicit in Professor Black's argument, but to avoid misunderstanding, they should be made explicit.

3. Professor Black's succinct review of "the part that technology and progress in the arts" have played in increasing the supply of food can, of course, be elaborated. I would be inclined to place somewhat more emphasis on the declining importance of land which has occurred as a result of the ease with which new forms of capital can be substituted for land resources. Moreover, the resources devoted to the improvement of the state of the arts in agriculture, including both research and extension activities, continue to run exceptionally high. The best years are in all probability still on ahead.
4. Professor Black anticipates an early return to individual producer quotas, especially in the case of cotton. He views these as damaging but finds quotas designed to induce export dumping "the least objectionable." By what standards, he does not indicate. The policy implications of this statement by Professor Black are as disturbing as they are far reaching.
5. The outline listing the adjustments that seem likely for the agriculture of the Northeast, Corn Belt, Great Plains, South, and the Far west, is full of valuable insights. One sentence however, puzzles me. It is, "Meat prices will decline less relatively than dairy product prices." No bench mark is given. Surely, Professor Black is not taking 1948 as his point of departure.

But all of these pin-pricks aside, the paper on which this review has focused, succeeds in putting the problem of the supply of food into a meaningful frame of reference for economic analysis. He is not disposed to conjure the devil in dealing with either conservation or population.

COMING READJUSTMENTS IN AGRICULTURE—THE INTERNATIONAL PHASE*

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IT IS useful and stimulating, upon occasion, to lift one's eyes from routine daily tasks in an attempt to evaluate forthcoming developments. It is only by placing our daily activities in the context of long-term policies and goals that we can give meaning and direction to the concrete piece-meal problems which daily confront us. Without such stocktaking we are in danger of losing ourselves in a maze of trivia. Even governmental administrators—or should I say especially governmental administrators—require such periodic stocktaking. But the difficulties are great. It seems as if the very nature of public administration, the duties and problems which land on one's desk every hour of the day, make the task of long-term thinking something to be put off until tomorrow. It is perhaps inevitable that the next step should be to make a virtue of the necessities of life in a governmental office and to regard with a certain amused skepticism the planners and visionaries.

It will be useful to state a few basic assumptions which underlie my thinking on the coming readjustments in agriculture.

The first of these is that, for better or worse, government will consciously "interfere" more in the future than in the past with the activities of the individual, in what it considers to be the social and economic interests of the entire group. Such conscious interference may, of course, be no greater than that which it has exercised, frequently unconsciously, in the past. Moreover, the interference may be largely, if not wholly, of the incentive type which appeals to the economic egoism of the individual and not of the regulatory or restrictive type which is often associated with governmental paternalism.

The second assumption is that the economic and social planning of governments will continue to be influenced by national political and military considerations, but that over the next decade or two—which is as far as the writer is prepared to probe the future—these considerations will be less a determinant of government policies

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than in the past. The ramifications and extent of the impact of political and military considerations on economic policy will, of course, vary from country to country in accordance with the political and military problems which it appears to confront and in accordance with the evaluation of future trends in the political-military sphere which its statesmen adopt. Some countries may, indeed, follow a policy of depressing production and consumption of goods and services which do not serve to further essential military purposes. But these instances are assumed to be relatively the exception rather than the rule. The writer realizes that this assumption may be invalidated by future events, but any other appears to him to be the council of defeat.

The third assumption, indeed this can be stated as a fact, is that the world's population will continue to increase steadily during the next few decades and that, in the absence of governmental measures to prevent or minimize it, any increase in the real income of any population group reflects itself in an increased demand for the products of agriculture. Whether the increase in demand for such products is more or less than proportional to the increase in real income is, and if the writer remembers correctly has been, a matter of some debate.

Finally, it is assumed that the world's agricultural plant is capable of meeting future demand for its products without a disproportionate increase in the resources devoted to agricultural production. Indeed, the writer is prepared to put this assumption in the "fact" class, and consequently agree completely with the remarks Dr. Black has just made on this subject.

Let us now, on the basis of these assumptions, consider the possible impacts on agriculture of the current conscious governmental emphasis on capital formation, which seems to the writer to be the outstanding socio-economic postwar development. The reasons for this emphasis need not detain us long. One is, of course, the physical destruction of World War II—a war which cost, according to recent estimates, more than 1,352 billion dollars, seven times the cost of World War I. Another is our advancement from kindergarten to first grade—the writer hesitates to say from grade school to high school—in our knowledge and understanding of the science of economics and its application to our daily problems. A third, although the validity of this reason may be debated, is the growing belief that the economic interest of the individual and of the group

are not necessarily synonymous. Be that as it may, one can hardly turn to any part of the world today without seeing the evidence on every hand. Development programs, or should we say plans since implementation still lags far behind, are the order of the day—industrial development, agricultural development, colonial development, ad infinitum, and as the obverse side of the coin—austerity programs!

It is, of course, axiomatic that the larger the proportion of the gross national product devoted to capital formation, the smaller must be the proportion available for current consumption. In major part, the products of agriculture are currently consumed. It follows, then, that during the accelerated capital formation period—referred to hereafter as Phase I[1]—the efforts of governments will be directed to reducing the effective demand for, or the availability of, of, agricultural products as a group by means of any or all of the devices that are available to it—high individual taxes, forced or high-pressured savings, rationing, import controls, and the like.

Obviously the compressibility of current consumption varies greatly from country to country. It is of one order of magnitude in a country with relatively high "standards of living" and of an entirely different order in a country where most of the inhabitants are at, or below, a bare subsistence level. The rate of potential capital formation, it may be noted in passing, is not only a function of the compressibility of current consumption, but of the extent of a country's idle productive capacity. The United States, for example, devoted nearly 45 percent of its current output in 1944–45 to the war and at the same time was able to provide its civilian population with 10 to 15 percent more goods and services per capita than in 1938. The United Kingdom, on the other hand, devoted only slightly more—about 50 percent—of its current production to the war effort but had to cut the supplies of goods and services 15 to 20 percent below prewar.[2]

Let us hasten to add that the compressibility of current consumption as a concomitant of capital formation is much more than a

[1] Phase I may be defined as the period beginning a year or so after the end of the war and ending when current production would thereafter be sufficient to maintain the quantity and quality of current consumption at the prewar level, or for some countries with a very low prewar consumption, at a somewhat higher level reflecting minimum standards of health, working ability and morale. The length of Phase I will, of course, vary from country to country.

[2] The Impact of the War on Civilian Consumption in the United Kingdom, the United States and Canada. G.P.O. 1945.

mathematical function of the standard of living. It is influenced by an enormous range of social, political, physical and psychological factors. Leaving all other considerations aside, the United Kingdom can compress current consumption infinitely more than France or Denmark merely by virtue of the physical fact that it imports such a large percentage of the commodities falling into this category.

Of special significance during Phase I is the impact of governmental programs of capital formation on the consumption and production of individual agricultural products or groups of these products. First of all, it must be recognized that even in the case of countries with a high standard of living the compressibility of the physical volume of food consumption is relatively limited, particularly over any considerable period of time and if adequate recognition is given to the necessity of maintaining the health and vigor to do an "honest day's work." Perhaps the best single measure of physical food consumption is caloric intake. Very few countries would find it possible to cut their caloric intake by more than 10 or 15 percent without a disproportionate loss in national output.[3] Hence, most countries will in any event, if at all possible, plan to produce or import sufficient food to maintain caloric intake at or near prewar levels.

The effect on current consumption of concentration on capital formation becomes even more apparent when the qualitative composition of the projected consumption patterns is examined. Stress is laid on the production or importation of those foods which constitute cheap sources of energy—primarily carbohydrates such as cereals, potatoes, and, to a lesser extent, sugar. On the other hand, the production and especially the importation of high cost foods are to be discouraged or limited to the extent permitted by physiological considerations and the willingness of the individual consumer to accept changes in long ingrained eating habits.

Administratively, this two-fold policy is relatively easy to implement in so far as imports are concerned—and the impact on the foreign producers is apt to be direct, and in the instance of producers of high-cost foods, painful. Its specific implications on American agriculture will be examined later on in this paper. The domestic producer, on the other hand, is very apt to find this policy

[3] Average daily per capita caloric intake in Germany in 1946–47 was about 25 percent below prewar, but distortions between urban and rural consumers as a result of the low national average made large segments of the urban population incapable of doing sustained physical or even sedentary work.

rather to his liking. The average consumer tends to be a rather unreconstructed individual whose taste and demand for "high-cost" foods is not going to disappear merely because his government has decided to undertake a vigorous program of capital formation, as long as he has the financial resources and would rather spend than save. So the government has to attempt to contain this demand by various and sundry measures ranging from high individual taxes to rationing. Frequently the measures are inadequate or unenforced so inflation and black markets become more or less general. Thus, any government, even though its internal management is effective and its budget exemplary, continuously has to balance the advantages of a rapid rate of capital formation against the internal administrative difficulties so created.

So far we have have been considering the "saving" aspect of capital formation. Let us turn briefly now to the investment aspect in Phase I. In what kinds of production should governments invest or guide private investment—in industry, in agriculture, or both, and if the last, in what proportions? This is the crux of the problem and the area in which human fallibility is likely to be most apparent. Purely economic considerations involving the rate of capital formation desired in Phase II, the "comparative advantage" of alternative lines of capital investment, and the plans of other national political entities are only some of the factors which have to be weighed. Others include military considerations and the internal political customs and habits of the past.

Generally it seems to the writer that the tendency will be for a considerable number of countries whose resources and experience suggest that their advantage lies in industrial production to place too much, and therefore uneconomic, emphasis upon capital investment in agricultural production. This tendency appears likely to be accentuated, first, by the fact that the major surplus agricultural producers happen to be hard currency—or "dollar"—areas, and, second, by the fact that the practice of maintaining relatively fixed exchange rates creates what appears to be a physical "dollar shortage." At this point the writer should like to digress long enough to clear his own thinking on this matter.

Since a vast majority of the world's governments maintain rigid control of their official exchange rates, the shortage of dollars appears to be an absolute shortage. If exchange rates were permitted to adjust themselves to one another relatively freely, then the

dollar shortage would manifest itself in the high cost of dollars. Our wartime experiences indicate that most of us have a different psychological reaction to the high cost of a commodity than to an absolute shortage of it.

For a variety of reasons which we cannot consider here, the dollar areas are currently the major source of many vital food imports, and in an effort to save the dollars being spent for these products uneconomic agricultural production plans may be undertaken which would not be initiated if exchange rates were free to reflect relative currency values.

In addition, the rationing of dollars by direct governmental control of the issuance of foreign exchange is bound to result in a different pattern of imports than if it were left to the individual to compete for the scarce dollar exchange resources and to utilize those he acquired as he saw fit. In the latter case imports of high-cost foods would undoubtedly decline greatly but a small flow would be likely to continue; in the former case, they may, and frequently are, cut off entirely.

Finally, it will be noted that in Phase I, food-importing countries will tend, in consonance with their import programs, to emphasize within the domestic agricultural sector the production of low-cost foods—cereals and potatoes among the carbohydrates, and milk among the "protective" foods.

How long is Phase I of capital formation likely to last? No definitive answer is possible. Moreover, it will vary from country to country but some clues may be garnered from the information that has become available on the long-term plans of the countries participating in the European Recovery Program. Phase I, as defined, is expected in the majority of these countries to continue well beyond 1952–53. Consumption of food even by 1952–53 is projected at a level, in terms of its composition, below that of the immediate prewar years, which in themselves were by no means the highest on record.

For 1948–49 the programs of the participating countries contemplate an average caloric intake of about 2,700 per person per day for the entire population, which is about 200 calories above the average of the previous year but 100 calories below the average prewar level, and 600 calories below the current level in the United States. The deterioration in the quality of this year's food intake, as compared with prewar, is even greater. Per capita meat con-

sumption is estimated at about 30 percent below prewar, fats more than 20 percent and dairy products about 10 percent below prewar. And prewar qualitative standards will not be regained, according to present plans, even by the end of the Marshall Plan period in 1952–53. The reduced level of 1948–49 consumption of some high cost foods reflects, of course, reduced current world availabilities but 1952–53 levels constitute planned adjustments which reflect the emphasis on capital formation.

Personally, the writer believes that the improvement will actually be greater than envisaged by the planners. The effects of mechanization to be undertaken during this period of capital investment, greater use of fertilizers and better seed, and expansion in the application of existing scientific knowledge could easily result in more production from the level of investment in agriculture now envisaged. Social pressures may prevent governments from reducing current consumption as now planned, and experience may indicate that current consumption has been compressed well beyond the point of diminishing returns. Somewhat less capital formation and somewhat more current consumption might well result in an increased aggregate output of goods and services even during Phase I.

So far the discussion has been directed to a possible sequence of events in countries where relatively large opportunities exist to compress current consumption. As such it applies most specifically to areas such as Western Europe. But with different time lags it appears equally applicable to other areas. The political and social organizations that have come into existence in Eastern Europe enable the governments to prosecute even more vigorously, though perhaps less effectively, programs of capital formation at the expense of current consumption. But there is one marked difference, which is of special significance. In Western Europe political military forces, as well as lack of viability in relation to the dollar exchange area, are interpreted to require capital investment in agricultural patterns to produce the maximum quantity of low-cost calories, whereas, it would appear to the writer that more emphasis on industrial capital for investment would, in the long run, yield greater economic returns. In contrast, Eastern Europe, due to the political and military situations combined with peculiar agricultural and industrial conditions prevailing in those countries, the very opposite appears to be the case. Capital investment is being

concentrated on industrial development, although with the abundance of land in relation to population and the low levels of agricultural productivity, greater economic returns could unquestionably be obtained if more capital resources were to be expended to stimulate agricultural production.

One of the direct effects of the preoccupation of Western European countries on capital formation in agriculture has been the growth of interest in colonial development. Large schemes to raise colonial production of fats and oils, cereals and other products have been launched and more are in preparation. These schemes involve the expenditure of considerable resources to open up new land areas, to spread mechanization of agriculture, to improve agricultural techniques, and to provide greater inducements to agricultural producers. Perhaps some of the projected investments in colonial agriculture would yield not only quicker returns but larger returns if they were directed to certain countries in middle stages of capital investment in which agricultural output could be substantially increased with only moderate capital expenditures, or to the exploration and development of non-agricultural raw materials.

Most Asiatic countries fall into a sharply different category. Statistics are inadequate for precise measurement of trends and developments. Population continues to increase, however, while political unrest and destruction caused by the war may well have caused the previous very low level of capital formation to become negative, and there are no immediate signs of any sharp reversal in the current situation. To reverse the present trend will not be easy. Very large financial resources will be necessary, in spite of the availability of cheap labor. For the next few years, it is difficult to foresee more than a stabilization of the very low consumption standards existing at present, or at best very slight improvements. Negotiations of international trade and commodity agreements among the countries of the Far East could help. With the limited capital available for investment purposes, it is imperative that it be used so as to secure the highest possible returns. A measure of specialization, with some countries concentrating their capital on industrial development while others use capital resources to develop agricultural production, would unquestionably be prudent; but political forces may influence negatively policies in this sphere. Furthermore, it remains yet to be seen to what extent foreign

capital and foreign scientific know-how will be associated, or, for that matter, will be willing to become associated.

Let us now consider briefly the implications of the preceding analyses on American Agriculture and the readjustments which appear in prospect for it. In order to do so we need to examine the postwar volume and composition of our agricultural exports. According to recent estimates, U. S. Government loans and grants in the three fiscal years beginning July 1, 1945 amounted to 16.6 billion dollars. Private U. S. sources provided in the same period about three and a half billion dollars in the form of loans and gifts. In addition liquidation of foreign gold and dollar assets provided about 5 billion dollars to pay for U. S. goods and services. These were the main sources from which the 25.5 billion dollar balance-of-payments deficit of foreign countries vis-a-vis the United States was paid for in the period from July 1, 1945 to June 39, 1948.

A large proportion of these dollar resources, as well as current dollar earnings were used for the purchase of U. S. agricultural products, which in 1947–48 amounted to 3–4 billion dollars, or about 4½ times the average annual exports during the thirties. Cereals became the most important U. S. agricultural export, by a wide margin. The three year average exports of nearly 475 million bushels of wheat per annum—as compared with an average of about 70 million bushels a year during the thirties—stands as a monument to the capacity of American agriculture to produce, and reveals the character of the new demand. But it must be noted that exports of dairy products, eggs, fresh and processed fruits and tobacco, while large in comparison with prewar for the whole three year period, began to show, by 1947, a marked tendency to decline.

During the period of the Marshall Plan, extraordinary assistance furnished by the United States to Europe will decline from the 5 billion dollar level of the first year to zero in the fifth year. Let us assume for our discussion that it will total 15 billion dollars over four years—about 60 percent of the net balance of payment deficit of the three years which ended on June 30, 1948. Unless, which is highly unlikely, sales of goods and services to the United States and private capital investment abroad, fill the entire gap between 8.5 billion dollars which represents the average annual net balance of payments deficit during the first three postwar years, and about 4 billion dollars which represents the annual average Marshall Plan aid, exports for the period 1948–53 cannot possibly approach

the 1945–48 level. Because of the compression of current consumption during Phase I, high cost agricultural products will be especially vulnerable. On the other hand, a relatively high level of exports of cereals, other low cost foods and products needed for special nutrition programs, for morale, or for incentives may be anticipated since other supply sources do not appear to be in prospect to meet the requirements of the importing countries for these products.

As current programs of capital formation achieve their objective of increasing production of goods and services, i.e., as we move from Phase I to Phase II, the trend in our exports of agricultural products will be influenced to a very considerable degree by our willingness to import (and, in the case of some commodities, at least, by our domestic pricing policies).

The question is the rapidity with which individual countries reach Phase II or indeed whether this stage will be reached in the foreseeable future. If it is not, then any balance which may be achieved is likely to be of a precarious nature, dependent for its survival on consumption below the prewar level, accompanied by restrictions on foreign exchange and foreign trade—and, furthermore, on the maintenance of uneconomic forms of domestic production, at the expense, basically, of the national standard of living, The answer to this question will depend to a very large degree on our ability and willingness to open doors through which foreign countries can bring their products, in ever-increasing quantities, for sale here.

If the preceding analysis is valid, the development of Phase II should witness the maintenance and perhaps even expansion of the demand of many countries for many of the agricultural commodities which have come to figure so prominently in our export picture; but our import policies will be of very great importance in determining whether countries deficient in these agricultural commodities will look to the United States or to other supply areas for meeting their requirements or even do without them and, no less important, the speed with which the transition from Phase I to Phase II is effected.

A PLANNER'S VIEW OF AGRICULTURE'S FUTURE

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IT IS one of the paradoxes of our particular society that we prefer to pretend that we do not plan—not, at least, as a whole society—and that, if we did, some essential liberties would have to be sacrificed. This pretense is less difficult to understand than it is to excuse. It is part of our backward look, part of the larger pretense that the world is simpler than it is, that it is like it used to be. Simple folk prefer simple institutions; and the smarter ones, who know what is occurring, are thus enabled to manage modern complexities to their own advantage. As a matter of fact, much—even most—of the planning in contemporary society is done by those who use it for their own purposes rather than those of the public, a situation which is remedied only slowly as time passes. But it is gradually remedied. Especially, in every crisis, formal and suitable public organizations take over the planning functions. When the crisis is past, there is reaction and most of what has been devised is scrapped.[1] But each time something remains. By now, even in "normal" times, there are at least rudimentary institutions for creating a picture of the future; and there are others which assist in making decisions reflectively rather than capriciously.

In no part of our social life is planning so carefully and so democratically done as in agriculture; in no part does it so nearly approach the necessary completeness for inclusion in a national plan. It may seem paradoxical to say that this is because in agriculture it has been so difficult to do; but it is nevertheless true. The disadvantages agriculture has suffered and their repercussions on the rest of the economy have gained consent to the gradual growth of a formidable organization for outwitting a whimsical nature as well as a hostile economic system. It is paradoxical too that in the industry which has been slowest to increase in unit-size, the scale of planning for it should be the widest; but that is also true. It is true because markets for staple farm products are nation-wide, because problems are common ones, and because stability depends on general arrangements.

[1] Within the memory of many men still living there have been three such crises: World War I, The Great Depression, and World War II, each of which left a residue of planning institutions.

In accordance with the rule that human beings prefer simplicity, the farmer prefers not to think of himself as the subject of elaborate study and as an object of social management. The farmer, as a matter of fact, of all people in our society, regards himself as the most independent; and economists would doubtless say that agriculture is likely to be the last stronghold of *laissez faire*. Yet—and perhaps partly because of this—the influences which impinge upon American agriculture, aside from those of nature—sun, rain, and wind—are almost all of them by now at least national in scope. Many of them are global.

Farmers may prefer to believe that they decide a good deal for themselves, and actually they may, for the moment, for the short run, but actually most of the issues about which they may regard themselves as free to choose, are decided in places and in ways which are far from local and far from individual. The decisions may be reached by the automatism of the market, since many farm prices come nearer the classical economists' ideal than any others in our economy. Or they may be reached in elaborately arranged processes which are as unlike the market automatism as is possible—such, for instance, as the referenda devised by the Agricultural Adjustment Administration in which national decisions are made regarding production. But in either case, the role of the individual is that of joining in a vast social process. These two choices really represent the farmer's available contemporary alternatives. He may abstain from taking part in the economic democracy of the Department of Agriculture and learn that he has registered an unconscious vote through the market mechanism; or he may decide to participate and become one of many in a vast process of conscious decision-making. In abstaining, he has not abstained; in participating, he has not been so much of an individualist as he has regarded himself as being.

The farmer comes to understand the inescapable socialization of agriculture or he does not; but at least he feels himself more and more caught up in an on-going process. And he either participates in attempts to influence it or he submits to having others do it in his name. This last is not very agreeable from the democratic point of view and the more independent-minded resent it. Yet it is what actually happens. As a result, there has come into this most individualistic of occupations the most elaborate planning known to

our economy, equipped with machinery for all the pre-planning processes and with a bureaucracy which, like all bureaucracies, sometimes conceives itself as having divine rights, but which on the whole has given agriculture a far more secure place in the economy than it would otherwise have. And all this has been in spite of professions by everyone concerned of unshakable loyalty to *laissez faire.*

The most pressing contemporary question is whether, as plans are attenuated and controls relaxed, economic storms will not come again. Planning devices were steadily strengthened during the New Deal and the war years; but many of them were given up at the coming of peace. How serious this will be depends upon the length to which attenuation and relaxation go; but already there are visible dangers. Most of the revulsion from the idea of planning comes from not appreciating its necessary processes. That these are necessarily more democratic—that is based on substantial agreement—than most others of government is not usually realized. They do require machinery and the machinery has to be operated by experts; but they largely consist in regularizing and making effective what is otherwise done but not done as well as is required in society.

How is planning done, for instance, for production? The picture of a farmer sitting down on a winter evening and conjuring out of his inner consciousness a program for his year's operations leaves a good deal out of account, especially in our times. His decisions are apt to be based on elaborate information as to the marketing possibilities of what he intends to produce as well as on what he knows or can learn about production. This information has come to him through a multitude of contacts and from many sources, many of them especially devised as contributions to his decision. These may be interested or disinterested. According to the theory of independence, he makes up his own mind in a welter of conflicting suggestion. Actually he follows occupational advice from sources he has learned to trust—his county agent, or bulletins and periodicals whose sources are known to him. And these are supplemented by special advice on many occasions either when he feels the need of it or when the welfare of agriculture, or even, sometimes, of the economy (in case of war, for instance) requires it. Or perhaps his choice is even more severely limited by not being able

to participate in certain benefits unless he chooses a certain course.

At any rate, behind the guidance a farmer gets these days is a most careful structure of planning, built upon long researches at experiment stations and in the offices and laboratories of economists to the support of which more and more public funds go as we grow more civilized, and these have been narrowed and refined by pre-planners. The web of information grows more complete; it forms a firm, if narrow, support for individual decision. And usually the individual finds it reasonable to lean on it. It needs to be firmer; it needs to be more free from contamination by the interested and the prejudiced; it needs to be more carefully organized. But most farmers do lean on it and they expect others to do so too, thus making a program of action as well as planning.

The organization and institutionalization of such planning requires exploration and examination, over and over, of all information and possibilities, and it means reaching substantial agreement in consultation, in hearings and ultimately in legislative approval, both as to facts and their implications. When, beyond that, the small percentage of mavericks are required to conform it is not a matter of much more importance to individual liberty than the requirement of living according to other laws—such as getting a license for hunting, having herds tested for disease, or conforming to drainage or irrigation regulations in an organized district. Look at it, for instance, as a process for production adjustment. Less wheat and cotton are needed; more hogs and dairy products can be sold profitably. These are facts—if they are facts—which can only be determined by study of world conditions, most elaborate, costly and disinterested study. No farmer could get them for himself; no organization of farmers could get them. And no farmer can arrive at the effect of his decision with respect to them independent of all other decisions which wlll also be made. It is only possible to approach such a decision as a planned decision, if any adjustment of a favorable sort is to be made.

Planning for Agriculture

The full-flowered operations of the A.A.A. as an operation in planning and social management were, in fact, only possible because of preceding work which had gone on for many years. This is not the place to review the origins and development of the intentions-to-plant program; or to assess its success in adjusting production to

demand.[2] It must be said, however, that, like so many mild and wholly voluntary measures, it sufficed for fair weather but not for foul. It was intended to prevent surpluses but it could not reduce production to the point which would have been required to maintain parity prices in the years of real crisis. The mere minimum rhythm of agricultural operations, even with reduced capital and scamped labor, produced "surpluses" in those years—more of some products such as wheat and cotton, than of others, but nevertheless actual surpluses.

No one knew better than those who devised and administered the adjustment machinery which superseded the intentions-to-plant system, that the adjustment ought to be up rather than down—that is, that the national consumption ought to be enlarged to consume larger crops. There might still be needed some switching of acreage from one crop to another: there was, for instance, too much cotton and wheat and too little milk and butter. But on the whole, more foods and fibres were needed. Only they could not be sold reasonably. And there came a time when they could not be sold even at prices which involved giving away as a bonus considerable margins of capital. The adjustment downward of production was an emergency measure, one of desperation.[3]

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[2] The name of W. J. Spillman will forever be associated with the growth of rural social action in America. He began early in the Century to feel his way toward agricultural adjustment and to lay the foundation in research and pre-planning for its later development. By 1918 he had brought the Office of Farm Management in the Department to the point of being the recognizable predecessor to the Bureau of Agricultural Economics and had published cost of production figures so embarrassing to Secretary Houston that he was forced to resign. The work, however, went on. When the action programs of the New Deal began in 1933, there was a firm foundation on which to build. This consisted not only in accumulated relevant knowledge but also in a central staff and a far-reaching field reporting system capable of finding out anything policy makers needed to know about agriculture.

[3] In Mr. Russell Lord's *The Wallaces of Iowa*, (Houghton, Mifflin Co., 1947) there will be found ample evidence that H. A. Wallace, before he became Secretary, and during his term, was aware of the necessity for a different approach than that represented by the early program of A.A.A. In many of his writings for *Wallace's Farmer*, and in many of his public papers, will be found foreshadowings of "balanced abundance," and of the soil conservation approaches to agricultural reform. It is sometimes forgot that a corporation to dispose of surpluses to the needy, rather than prevent their production, was one of the earliest inventions of the Secretary's regime. Its policies were worked out largely by Mr. (now Judge) Jerome Frank and others in the Secretary's group. The author also, before becoming a Department official had foreshadowed more constructive policies in, for instance, "*Farm Relief and a Permanent Agriculture*," Annals of the American Academy of Political and Social Science, Vol. CXLII (March 1929), pp. 271–282, as well as other exploratory articles. The sole excuse ever put forward for reduction was that it was necessary in the circumstances. Also, it is usually forgot that the surpluses of wheat and cotton, at least, were absolute surpluses and needed to be reduced in any case.

It was before long replaced by one which made much more sense in principle, and had been in prospect for a long time. To make adjustments which were in the interest of conservation was a considerably higher objective. But even this was not what any conscientious planner would want. He would have in his mind most prominently those famous diet contrasts shown in the home economists' tables and the acreages needed to achieve the highest of them.[4] And he would say that the objective for which he could work with most enthusiasm would be a full fed and well-clothed nation and an agriculture whose intention it was to supply the materials for such a program. Planners looked morbidly at the high, low and middle diets and wondered at a social system which enforced the low one—which meant malnutrition in various degrees for perhaps a third of the population.

How is collective planning done for individualists? It seems like a contradiction in terms. There was, of course, one way—the way the farmers had always wanted: this was to guarantee a market at a profitable price for everything farmers cared to produce. The difficulty was to figure out what to do with wheat, cotton, and certain other commodities when they had been produced. The direct answer to this was again obvious: to furnish a considerably increased purchasing power to consumers. There would still be too much of some things; but the worst effect of the larger surpluses would be mitigated.

Such a policy as this would involve some drastic modifications of the economic system—so drastic indeed that farmers as voters would not accept them. They would take assistance from the government if it was made palatable; but they preferred to be helped in ways of which they need not be made conscious; and least of all did they want the consumers of their goods to be subsidized at the cost of an unbalanced national budget. Whether, when surpluses had been produced, they were consumed, whether they were dumped abroad—or even dumped in the sea—they preferred not to have to choose.[5]

[4] "Diets at Four Levels of Nutritive Content and Cost," U. S. Department of Agriculture, Circular 296, p. 31, 1933. For an account of the origin and use of this report see *The Wallaces of Iowa*, op. cit. p. 386.

[5] It was the dilemma into which planning officials were plunged as a result of this inconsistency which caused Mr. Wallace to write his protesting pamphlet *America Must Choose*. This was published in the Spring of 1934. This early, it will be seen, Mr. Wallace felt the pressure of his dilemma. He was required to do the impossible—to solve a problem without the means to do it. "We cannot dream our way into the

The department was expected to arrange for a full-running agriculture, but it must be done invisibly, by some magical process, which not only would be unseen, but would be costless.[6]

Mr. Henry Wallace labored long and hard to reconcile the interests of farmer and consumer, telling each alike that what he wanted was necessary to what the other wanted. A full diet and full farming operations were "part of the picture"—a phrase which meant that there existed a mutual relationship within an organic whole. Full production and full consumption each went a long way toward making the other possible but not the whole way. For the city consumer got his income from commerce and industry: this was the other half of the national economy; and it was the despair of the agricultural planners. For industrialists, although they talked like individualists too, were far more dangerous, as such, than the farmers. They were, many of them, elephantine individualists in a world of rural mice, crashing about with devastating effect in the economic forest.[7] They might take fright at a mouse underfoot, but even in fright and acting without consideration,

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future," he said, "we must be ready to make sacrifices to a known end. As we wrestle with all the known complexities which now beset us, the temptation is to give way to false and easy hopes . . . much as we dislike them, the new types of social control . . . are here to stay and to grow on a world or national scale. We shall have to go on doing all the things we do not want to do. The farmer dislikes production control instinctively. He does not like to see land idle and people hungry."

[6] This calls up the whole long story of the fight for agricultural "justice." To recount all of it would require going back to the agrarian movements which began as soon as the western settlers acquired debts and found it difficult to pay for them with cheap produce. But the connected forerunners of New Deal action have a long enough history. It involves all the McNary-Haugen agitation, for instance, which was a plan for selling abroad at a lower price than would be maintained on the domestic market. This had many phases. It turned into what was called the domestic allotment plan and was embodied in the measure put before the lameduck Congress of 1932. Then there was the "export debenture" plan; and there were others. The Agricultural Adjustment Act was something of an omnibus bill because of the partisan support for various alternate schemes. In it the Congress simply delegated to the President and the Secretary power to choose whatever scheme seemed best and to put it into action. The differences were thus merely transferred to the administrators who continued to differ. Mr. Peek, the first A.A.A. administrator, believed in export dumping and was made unhappy by the Secretary's insistence on crop reduction. The differences over policy finally became quarrels and Mr. Peek retired. Differences continued; but there was agreement on the necessity for the main action program. And there was substantial support for it among farmers generally. It—or something—raised agricultural income rapidly. And "parity" became a realizable objective almost at once.

[7] A rough estimate indicates that perhaps 85–90 percent of the world's people still live on farms. This is, of course, much higher than the proportion for the United States which is about 20 percent. This is a proportion which is changing rapidly but the change is giving agriculture relatively less rather than more economic power because the average size of industrial operations increases so much more rapidly.

enormous consequences resulted from their smallest decisions.

What the authors of the A.A.A., as an emergency measure, had really done, was to conceive the economy as a dichotomy. They had divided all income into that of agriculture and that of industry and then had tried to make such reductions in agricultural production as would bring the prices of its products into a "parity" (that is a reasonably reciprocal relation) with those of industry.[8] They hoped to establish a basis for the exchange of the two kinds of products which would be substantially that which had prevailed in "good" times. If they could do that, the balance, once achieved, might assume an upward movement, and the rearticulated economy go forward as a whole. The carefully conceived program, as is so often true, fell into bargaining among economic groups, through a Congress which had no conviction in the general matter and no standard by which to judge, and which responded to the strongest and most immediate pressure no matter what its long-run effect. What resulted was something far from well calculated to achieve the effect. But it was something. Together with President Roosevelt's reluctant simultaneous devaluations of the unit of currency, and both farmers' and consumers' subsidies—by various devices, including work relief, a two price system, and even dumping abroad —a tolerable situation was achieved.

The real difficulty, the basic difficulty, with the program was that it seemed not to be educative so that its elements of reciprocity could become permanent and its inflationary supports be dropped. None of the individualists appeared to realize that his future existence as a functioning part of the economy would thereafter depend upon the maintenance of a calculated relation with the rest of it. All in chorus talked of "getting back to freedom." That kind of freedom had gone from the world forever if it was not to fall into a worse disaster than that from which it had been rescued. But some education was evidently necessary to persuade democrats that this was so. They had demonstrated that they could not learn from experience. They would not tolerate the logical and necessary extension of the institutions they had already accepted.

President Roosevelt had to go on and on with an unbalanced budget, subsidizing the most demanding elements of the economy. He had to go on until W.P.A. merged into war production. It has to

[8] The preferred word was "balance," but parity had so much more technical correctness that it was finally adopted as the official term indicating reciprocality.

be remembered not only how the emergence from depression was accomplished, but also that there was an almost immediate oncoming of preparations for war. It is often said that it was easy for Hitler to boast of having cured unemployment because he had all the unemployed either in the army or hard at work making munitions. In a way it was forced work paid for by inflation. The same thing was true of the Russians. And to a large extent it was, it must be admitted, true in the United States. An attempt had been made in 1936 to withdraw subsidies and relief spending. The recession of 1937 showed that it could not be done without disaster in an unarticulated economy. It was never tried again; and the gradual rise of war preparations and then production for war itself made it unnecessary.

Lessons from War Years

When the nation really began to work seriously at the business of getting ready for war, there occurred another of those miraculous expansions which, to all those who were old enough to recall the events of 1917, was no surprise. It was proved then that, even with the stimulus of something like a billion-and-a-half of annual subsidies, operations had been no where near the productive potential. Not until then had there been found what was needed to release the binding-cloths which had prevented the growth and expansion which should have come from widespread technical education, vast accumulations of knowledge, discoveries of new materials and processes and the developing science of management. Then the lesson became too plain to miss. The expansion of production which occurred during the war revealed that the system had been operating to withhold as much as to produce.

What made the difference? An assured market; a great general incentive; moderately good planning; fairly effective administration; abandonment of withholding. These were the facilitating minima. But, again, the assured market was financed not so much by balanced mutual exchange among producers as by inflation. Even in the great emergency the self-discipline of mutuality could not be found in sufficient intensity. There was more of it than there had been in peace times; but as the crisis of the war passed, it was rapidly dissipated and there soon set in a competition among various interests to see which could be most effectual in breaking down the structure of articulation and control.

It could be seen by those who cared to learn the lesson that at the enlarged productive rate of 1942–48 the nation could live better than it ever had before and yet devote something between one-third and one-half of its total income to projects for future development—it was war, then, or recovery from war; it could as well have been highways, hospitals, schools, scientific laboratories, houses. It could also be seen that we had been learning to operate the planning agencies. The O.P.A.; the W.P.B.; the W.F.A.; the O.D.T.; the W.S.B.; the R.F.C. and many similar controlling devices were working better and better; best of all, the stabilizing and central directing offices—the E.O.M.; the O.W.M.; the O.E.S. were beginning to be taken for granted and were performing their functions with greater and greater comprehension of their objective—which now lay beyond the victory and was called Reconversion.

In all this agriculture had done and was doing very well. In spite of some vacillation at the top, both in the old Department and in the War Food Administration, it had gone forward into prosperity. There had been recognition of its importance and a disposition to be fair; there also had been gratitude to those who had fed and clothed the armies and now were feeding and clothing the displaced and suffering millions in Europe and even in Asia. Would it have been expected that the agencies of stabilization would have been disestablished? I think not. Yet they were.

It was evident that not much had been learned and that much had been forgot. It was also evident that we were in danger of returning to a situation, once familiar but now happily almost forgot, of idle men, idle factories, great projects not being carried out—the new world, of which we had been given a glimpse, postponed so that a futile struggle for advantage could go on. Depression would be delayed so long as we fed and otherwise supplied a devastated world; but that would not be likely to be long, for the nation was in no very generous mood. President Roosevelt, political genius that he was, had not brought the various parts of the system into a permanent workable balance. He had gone some way; he had become genuinely expert at crisis management; but the know-how had not yet become traditional and institutionalized. And when he had gone, it had at once appeared that, lacking greatly inspired leadership, there was still ample scope for self-interested pressure, and insufficient resistance in the stabilizing machinery. This was a weak-

ness which came from deep down in the democracy among those who had done well in war production, and who controlled local public opinion. Of these there were millions; for they included even workers and farmers. They wanted to go back to what they called "freedom." It was this desire, fundamentally, which made it impossible, when victory had come, to plan or act in the public interest except as it might accidentally emerge from the conflicts among extremely complex interests.

There are those within such a vast bureaucracy as that of the Department of Agriculture who are permitted to devote themselves to the procedures for survey and analysis which are the indispensables of pre-planning. In the course of years they have accumulated an enormous store of relevant knowledge. The various statisticians and economists are sufficiently skilled also in putting all this knowledge together in ways which would be useful if it had a containing framework; and desirable objectives are continually being defined—such, for instance, as the full diet for Americans, or, for other instances, social security for all citizens, or the conservation of farmland and forest resources. Yet something is lacking—more than just something. It is, as a matter of fact, that sense of organism, of *gestalt* without which the nation cannot any long function effectively. It breaks down on analysis into: (1) a definition of the relation of agriculture to the economic organism as a whole; (2) machinery for judging current proposals by a development plan; (3) instrumentation in government for the long run and general interest when expediency or private interests run in the contrary direction; and (4) means of requiring conformance on the part of small minorities who refuse to join in general and agreed action.

Constitutionality and the Concept of the Whole

These are, of course, matters which have constitutional implications and need exploration in terms appropriate to their legality. But they are also matters of political economy, the assumptions of which are of prior interest. If it is important enough, and sound enough, constitutional change can be argued for; otherwise not. As to this, what is implied is that agriculture cannot be benefited as an interest by itself and at the expense of the rest of the economy. The situation is such that in a contest of pressures agriculture will always be likely to lose. It may not seem so at any given time; and professional lobbyists may so disturb the issues as to convince most

farmers that they can exploit the rest of the community. But it will seldom be true; and, perhaps, never for the long run. The nature of technological advance is such that it will usually be applied first in industry; and the more rapidly progressing parts of a slackly controlled organism will exploit the less rapidly progressing parts. This will be a wholly involuntary result, working out through the automatic or semi-automatic operations of the market place; it will be helped by the family-farm preference, so prevalent in the United States, which will hinder progress toward an efficient scale of operations.[9] At any rate, within the framework of prevailing preference, the farmers' only defense is to get countervailing subsidies from a Congress which happens currently to be sensitive to agricultural interests, but which may well gradually cease to be as the proportion of farmers in the whole population declines, as industry disperses itself into what are now almost exclusively rural regions, and as the disproportion of scale and progress in efficiency becomes more exaggerated. The farm-bloc which has been so powerful in recent years may fall apart in the future from the attenuation of its constituency.

The farmers' real hope, it may be predicted, will prove to lie in developing a concept of the general interest and in perfecting machinery for maintaining the integrity of all the parts of a balanced whole. Intimations of such a concept were implied in the parity-price provisions of the successive A.A.A. acts and in such a word as "parity." Parity implied a condition of well-being for others than farmers.

Balance implies a near-organic concept of the economy. It carries with it the suggestion of indispensable central planning: the governmental machinery for making decisions concerning policy so that results will accord with what has been worked out and agreed on. This does not necessarily imply an independent Central Planning Agency. Such an agency might be called anything and might be dispersed in almost unrecognizable pieces throughout the government. But the essentials would have to exist: a way of getting an approved plan and a way of protecting its integrity against caprice and selfishness no matter under what attractive guises these betraying interests presented themselves and no matter where they might originate.

[9] Perhaps not so greatly as some theorists argue, because, in spite of resistance, a consolidation movement goes on. As in other industries, management problems become more complex, and the better managers extend their holdings.

Constitutionally—regarding the constitution less as a legal instrument than as a court-created tradition—the difficulties of recognizing the American economy as an articulated whole are considerable but not absolute. It has to be recalled what position the Courts are in when there is so little recognition elsewhere of essential economic and social unity. It has to be recalled that there are not many even yet who recognize that a national organism without an institutional mind or higher nerve centers is a kind of horrible Frankensteinian monster whose casual and brutal wallowings will certainly create catastrophe.

The guess may be hazarded that people in this democracy simply have not yet made the connection between their fears and the source of them—or for that matter between their hopes, such as they possess, and a firm and understood program for achieving them. They are therefore open to persuasion that men who want balance are "crackpots." This is a strange paradox and can only be understood by knowing the elementary state of our information in such matters. The schools do not teach, and organs of opinion do not insist, that we must achieve organic relations among the elements of the economy and provide ways of preventing any part of the whole from exploiting the other parts. That such exploitation returns to torment even its authors, is a lesson which seems to have lain plainly in the events of the "twenties" and "thirties"; but there has been a kind of determined refusal to draw the lesson—which again can only be understood by remembering what its acceptance would imply. This, of course, is a willingness on the part of each to subordinate his own initiative in the functioning of the whole. That he would have had a part in creating the development plan in democratic fashion and that the machinery for operating it would be strictly impersonal, has not penetrated public consciousness or, at least, has not offset the intense concentration on the pursuit of private objectives. Workers and farmers, as well as most business men, oppose the least suggestion of the only kind of public policy which can lead to stability. They could only be brought to modify the dangerous disparity between such an end and the means which might achieve it, by the systematic and prolonged insistence of those whose duty it is to explain such matters. The obligations of leadership seem to have been singularly neglected in this respect.

The constitutional reversal cannot possibly precede and obviously must follow at some length reversal of public feeling in such a fundamental matter. It is true that there have been gains and

that there are clear evidences of vision in the Courts. That these gains should run, as yet, to a concept of the nation as an organic whole would not be expected.[10] Positive guidance of certain elements of the economy is already fact; and agriculture shares prominently in the gains from this guidance. But this, again, is not a recognition that public welfare cannot be achieved except by the subordination of each special interest to that of a larger whole. It is, perhaps, not so very far from such a recognition, at least not so far that it cannot be predicted that full recognition would come from the courts if it should be generally demanded. That there should be demanded a social progress in which the interests of each were merged in those of all is prerequisite. The courts cannot go faster than is demanded.

What the planner sees is thus limited by his apprehensions. He must continue to believe that the weaker interests in the economy will suffer first and most seriously; and that this will be followed by general paralysis as the results of this suffering spread to other parts of the organism. There is no reason for not anticipating that the weakest interest will not again be agriculture as it was in the "twenties"; and that a general depression will not follow an agricultural deflation.

Planning Under the Hope-Flannagan Bill[11]

The planner must also be apprehensive about time. The saying among government economists that "America had been priced out of a boom," which became current as the results of abandoning price controls became apparent in 1947, indicated a similar fear about time. Each rise in price reduced the reservoir of savings which had been counted on to carry the economy into "normalcy." A characteristic of these changes was a competition for price position which at once attained frightening intensity. The government's agencies seemed to assume the character of means for gaining private advantage rather than that of mechanisms for maintaining stability.

All this pleased so many of those who held positions of leadership that it seemed quite clearly to be a movement back to what

[10] Yet current interpretations of the Commerce Clause might easily be imagined to be based on some such conception.

[11] Public Law 733, 79th Congress, Chap. 966, 2nd Session. The *Hearings* on which this discussion is based are those of 13 June to 26 June 1946, before the House Committee on Agriculture on H.R. 6932.

was a generally approved pre New Deal system of social arrangements. Because of the concertedness of this movement and its accelerating momentum, the planner, who must think in terms of his technique—the development plan and the subordination to it of individual initiatives—as a way of gaining stability, could hardly consider lesser problems.

Planning for agriculture, when it developed a comprehensible shape during New Deal days, consisted largely of showing how and on what terms reciprocal relations with other great functioning divisions of the social economy might be established—notably, industry. This was inevitable in so great an emergency as then existed. This parity was identified as the relationship which *had* existed at a time (1909–14) when agriculture had at least not been depressed, had not been a drag on the whole economy, had even been making some progress. The first A.A.A. was an action program for establishing parity according to plan. The second A.A.A. introduced the idea of conservation—that is, parity gained through or at least with—conservation. The other large ideas devised by the planners were those of the ever-normal granary; and means for disposing of surpluses without reducing production beyond an essential minimum (these took various forms, as diverse as free distribution to the indigent and expansion of industrial uses for farm products). These devices about used up what accumulated agreement existed and could be translated into action. It was thought that they did at least furnish protection against the worst possibilities of the future, a kind of minimum for agriculture in an uncertain world.

Yet there was great uneasiness; and probably no one was satisfied that either stabilization or progress had been assured by the institutions brought into being with so much effort. And the pressure groups operating upon the Congress showed very clearly how deep this uneasiness ran: they demanded more and more rigid protections. They sought to redefine parity—upwards, of course. They sought to establish minimum guaranteed prices by means of commodity loans. They sought to have exports subsidized. But also, they sought to enlarge research.[12] And this might well be thought to be the most significant development of all. For through it agriculture might find new ways to improve and to defend itself from insecurity.

[12] Most formally in the Bankhead-Jones Bill which became law in June, 1935 to which the Hope-Flannagan Bill of August, 1946 is an amendment.

It was, it must be noted, always called "research" and not "planning."[13] On research, however, there was placed a limitation. It had to be directed toward the assistance of private enterprise. It was, in fact, roundly stated that "Congress hereby declares that a sound, efficient, and *privately operated system*, for distributing and marketing agricultural products is essential. . . . " The fact that the Hope-Flannagan Bill, which would extend the research begun in New Deal days should be so insistent on private enterprise in distribution would seem to isolate a prospectively fruitful field for exploration and label it "untouchable." Yet "private" includes cooperatives. So it must have been intended merely to exclude government ownership or operation. This was, it may be guessed, not only in response to pressures of private and cooperative processors and distributors, but also an expression of genuine concern. But it is a limitation which ought not to have been imposed if genuinely free research was to be encouraged. Research in Russia—whose conceptual direction of research we condemn—must be similarly limited. A Russian Hope-Flannagan Bill would doubtless condition its terms to include *only* public ownershlp and operation.

We are, in other words, not yet ready for wholly honest research in marketing—only such research as will confirm, or at least be limited by a general concept of the economy, a particular view of what is the proper conduct of economic life.

If we, without prejudice, look at the possible ways of improving agriculture's position in the economy so far as they can be seen by drawing on knowledge general in the community, the possible improvements in production are undoubtedly the most obvious. Production has been the subject of immense efforts in the past and will be the subject of greater ones in the future. At its furthest imaginable and most fantastic advance it might reduce farming to a marginal or avocational occupation: once in a while some such suggestion is made. Synthetic foods and fibres have not yet made significant inroads on the farmer's province, but their development is something not impossible in the light of what is already known to science, and actually some of them are already in use. Short of

[13] A certain percentage was reserved for research in "marketing." What the distinctions are here is not at all clear. Does research in marketing mean merely the discovery of more marketable forms for farm products, better physical ways of getting them to the consumer, and more agreeable services in connection with them? Or does it include examination of the whole middle-man complex to establish low cost distribution?

that, perhaps meanwhile, genetic, chemical, pathological, and ecological researches are certain to be greatly advanced just by extension of present activities. And so are the enormous contributions of engineering. There are no items in this list which may not be forwarded within the terms allowed by funds now available or to be made available. And continued progress may be expected.

More progress has been made in these matters, by far, than in the adjustments to them which must be made by social organisms, institutions, customs, laws, and prejudices. There is even a reluctance, amounting almost to tacit conspiracy, to prevent the necessary exploration of these matters.[14] Unless this range of subjects be defined as "marketing," or as "utilization" the categories recognized in the Bankhead-Jones and the Hope-Flannagan bills, it would appear to be entirely exempted from exploration. Yet it would seem to hold great promise.

When one goes back to the purpose of agriculture in society, it must be defined quite simply as the production of food and fibres for the community. To this we have been inclined to add, as civilization has grown, a duty to conserve the productive elements, soil and water. There has been a tendency to build on this rather simple responsibility a rather elaborate structure of rationalization—easily traced to the antiquity of the occupation, its "primary" nature and so on. This rationalization would set farming apart as something more than a producing and conserving occupation, as in fact, a way of life. This easily expands into a theory of protection for its qualities and relief from its disadvantages, if necessary at the expense of the rest of the community. The family farm becomes more than a producing unit, and tendencies which would weaken it become antisocial. Ownership becomes an absolute good; and any threat to it something to be combatted vigorously.

Research into matters which are beyond rationalization is prevented as a matter of course if it as at all possible. And even when forces at work are so universal and powerful that trends persist in

[14] This is an old theme with the author of this paper. For instance, in an address to the General Assembly of the Institute of Agriculture in Rome in 1935, he said, "The long and unspectacular growth of productive technique has transformed the world under our unseeing eyes. We now have to find the social and political adjustments which are appropriate to it." And even before that—a decade before—he had written a book, *Industry's Coming of Age*, whose purpose was to persuade economists that a restudy of their concepts had been made necessary by the transformation of agricultural and industrial techniques.

spite of efforts to reverse them, the concealment and blindness continue. Without laboring this point, it is not hard to see that a detached observer would be able to point out areas for exploration in these fields which might be extremely important. Of course, many of the facts are and have been for some time available; but there have been few attempts to set up and assess alternatives.

It is by extension of the rationalization concerning farming as an owner-operator enterprise that marketing is conceived as a private occupation. Yet there is not the same certainty in this extension. It was not felt necessary to say that government should keep out of farming. But it was felt necessary to forbid research which looked in any such direction. This may have been the result of private processor influence on legislation; but it would find sympathies already prepared among Congressmen whose farmer constituents, however much their livelihood might depend on government interferences, maintain the fantasy that they are the economy's only remaining unreconstructed individualists.

It is not necessary to suggest that agriculturists would not make a similar suggestion or entertain similar prejudices about other occupations. Has not the farmer been the traditional prime mover for the regulation of railroads, stock yards, seed concerns, produce exchanges, oil and power companies, "Wall Street"—in fact, most of the other activities which touch farmers in any way? It would be naive to suggest that this difference indicates a feeling of inferiority. It is much more sensible to suppose that it rests on an assumption of superiority; a feeling that agriculture ought to have everything else regulated in its interest. It is a familiar impulse which wants all other interests regulated except ones own so that the single free factor in the economy may maintain an advantageous position. That the farmer has not gained much from this attitude might be argued, if it was known what his situation might otherwise have been, or what it might still be with a drastically changed structure of ownership, operation and regulation.

No other field is so completely unexplored. Its immense possibilities may not be of interest to any individual farmer or any other specific agricultural interest; yet they certainly are of interest to the whole economy and even to agriculture in the economy. Suggestion for such explorations is often taken as hostility to agriculture. Of course it is not. It is merely hostility to those who would keep agriculture and the economy shackled to prejudice and who

would rather have no progress than progress which does not conform to their preconceptions.

Chancellor Hutchins, on taking a year's leave from the University of Chicago, recently, to devote himself to adult education, reported to have explained that there was not time enough left for the education of youth. The only hope left, he was said to have indicated, was that of changing the minds of those who were already responsible and influential citizens. The planner must also feel this same urgency as fate-laden events tumble upon one another. He must be more and more appalled that in a civilization so certainly doomed unless separatism, exclusiveness, and reaction can be drastically modified there should be such determined clinging to privileged positions and vested concepts. He must feel that now, of all times in man's history, intelligences need to be freed for exploration and experiment.

President Conant of Harvard in the Spring of 1947 had some very harsh things to say about the backwardness of the social sciences in comparison with the natural sciences. He intimated that the lack of progress might well force the natural scientists to develop the social fields. If there is wonder at this deficiency, examination of the conditions attached to the Hope-Flannagan bill may provide an explanation. Natural science has not, since its nineteenth century struggles with religious orthodoxy, had such handicaps of prejudice to overcome. The planner, like other social scientists, may not have great hope of modification in these attitudes and the attainment of freedom in time to avert clamity; but he must be forgiven for insisting that materials are being played with which are likely to destroy the world unless they are made to conform to civilized disciplines.

PLANNING UNDER THE RESEARCH AND MARKETING ACT OF 1946; A STUDY IN THE SOCIOLOGY OF KNOWLEDGE

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WITH the Research and Marketing Act of 1946[1] Congress provided the statutory basis for a greatly expanded program of research in the natural and social sciences. Plainly the questions that are asked in this program of research will largely determine the answers that are found.[2] Plainly, too, there is no purely objective basis upon which the questions can be formulated—no basis, that is, apart from the interests and motives of human beings. It should be worthwhile, therefore, to inquire into the interests and motives that are controlling in the selection of problems for study under the Act. How do some questions (and not others seemingly as pertinent) happen to be asked at this particular time? What value premises (biases) are implicit in the questions? Are the questions congruent with the realities of the situation toward which they are directed? Are they congruent with the nature of science? Inquiry along these lines in the manner of the sociology of knowledge[3] should help us understand what may be expected of the Research and Marketing Program. Beyond that, as a case-study of an area of social activity which one might expect to find characterized by a relatively high degree of rationality, the inquiry should shed some useful light on the tasks that face the social planner.

This paper is in three parts. The first summarizes the terms of the Act, the planning procedure followed under it, and the research and marketing program formulated for the fiscal year 1948. Because of space limitations, this section is much condensed; it is assumed that readers of this JOURNAL have easy access to other descriptive material.[4] The second part of the paper describes the

* The author wishes to acknowledge the help he has received from Louis Wirth's lectures on the Sociology of Knowledge and from Charles M. Hardin's criticism of an earlier draft of this paper.

[1] Public Law 733, 79th Cong., 2nd Sess.

[2] This is true although the role of accident in research in the physical sciences is very great.

[3] The awkward term "sociology of knowledge" is a translation of the German *Wissenssoziologie;* it means the study of knowledge in its societal setting. The formulation used here is that of Karl Mannheim in *Ideology and Utopia* (Wirth and Shils translation) New York: 1946.

[4] See the statement by the Administrator of the Act in this JOURNAL, 29: 4 (Nov.

social forces and the events which culminated in the Act and the research program for 1948. Here it will be assumed that the reader has read Charles M. Hardin's article on political influences and agricultural research.[5] The final part appraises the ideology that is revealed and considers the underlying problem—how to formulate an agricultural research program which is congruent with reality—in the light of the sociology of knowledge.

I

The purpose of the Act is very broad; it is (in the general title) "to provide for further research into basic laws and principles relating to agriculture and to improve and facilitate the marketing and distribution of agricultural products." This general language is so qualified in the body of the Act, however, as to create four quite distinct programs:

PROGRAM 1. (Title 1, Sec. 9) *Subject matter:* basic laws and principles relating to agriculture in its broadest aspects, but not less than 20% of appropriations must be used for projects in the field of marketing. *Agency:* State Experiment Stations, but not more than 25% of the appropriation may be allocated to a Regional Research Fund for use on projects in which two or more Stations are cooperating.

PROGRAM 2. (Title 1, Sec. 10a) *Subject matter:* utilization only. *Agency:* USDA in its own laboratories or by contract from USDA to public or private agencies.

PROGRAM 3. (Title 1, Sec. 10b) *Subject matter:* basic laws and principles other than utilization. *Agency:* USDA in cooperation with Experiment Stations or other agencies if Stations concerned approve.

PROGRAM 4. (Title 2) *Subject matter:* marketing research and services. *Agency:* USDA or USDA with public agencies (including State departments of agriculture) and private agencies or organizations by contract or grant.

The amounts authorized for appropriation in the Act and the amounts actually appropriated for the fiscal years 1948 and 1949 are shown in the table at the top of the next page.

Other noteworthy features of the Act include: 1. USDA may not carry over appropriated funds from year to year (although it may let contracts running for four years), 2. All research must be on "new" projects; funds may not be used to expand projects already

1947) and especially *The Agricultural Research and Marketing Act*, Special Report No. 19 (April, 1948) by the Agriculture Committee on National Policy of the National Planning Association.

[5] "Political Influence and Agricultural Research," *The American Political Science Review*, 36: 4 (August 1947), pp. 668–686.

APPROPRIATIONS (in millions of dollars)

Program:	Actual		Authorized					
	1948	1949	1947	1948	1949	1950	1951	After 1951
1	2.5	3.25	2.5	5.0	10.0	15.0	20.0	*
2	3.0	3.90	3.0	6.0	9.0	12.0	15.0	*
3	1.5	1.95	1.5	3.0	4.5	6.0	*	*
4	2.0	4.75	2.5	5.0	10.0	15.0	20.0	*
Total	9.0	13.85	9.5	19.0	33.5	48.0	61.0*	*

* In amounts as necessary.

under way, 3. A committee of nine elected by the Experiment Station directors and approved by the Secretary must approve all regional projects in Program 1, 4. The Secretary is directed to establish a national advisory committee of eleven members, six of whom shall represent producers or their organizations. The Secretary may establish other appropriate committees, including representatives of producers, industry, government, and science.

The Act was signed by the president in August 1946. Two months later Secretary Anderson appointed the following National Advisory Committee:

Fred Bailey, Washington, D. C., Legislative Consultant to the National Grange.

Robert R. Coker, Hartsville, S. C., Vice-President of Coker's Pedigreed Seed Company; officer of banking, mercantile, and cottonseed oil firms. Member of the Board of Directors, National Cotton Council.

John H. Davis, Washington, D. C., Executive Secretary of the National Council of Farmers Cooperatives.

C. W. Kitchen, Washington, D. C., Executive Vice-President of the United Fresh Fruit and Vegetable Association.

Albert K. Mitchell, Bell Ranch, N. Mex., Manager of the Bell Ranch.

Walter L. Randolph, Fayette, Ala., president of the Alabama Farm Bureau Federation and a director of the National Cotton Council.

H. J. Reed, West Lafayette, Ind., Dean and Director of the Purdue University School of Agriculture and Director of the Experiment Station and Agricultural Extension.

W. Kerr Scott, Raleigh, N. C., State Commissioner of Agriculture and a former county agricultural agent and recently elected Governor of North Carolina.

H. E. Babcock, Ithaca, N. Y., agricultural writer and chairman of the Board of Trustees of Cornell University; member of the Board of Governors of the National Farm Chemurgic Council, Inc.

James S. Patton, Denver, Colo., president of the National Farmers Union.

Charles F. Kettering,[6] Dayton, Ohio, general manager of the Research Laboratory Division of General Motors Corporation and member of the Board of Governors of the National Farm Chemurgic Council Inc.

After consultation with this committee, Secretary Anderson named E. A. Meyer administrator of the Act.[7] Mr. Meyer is in full charge of all of the Department's marketing activities and is responsible for the "general direction" of research in natural and social science under the Act.[8]

On the recommendation of the National Advisory Committee, Mr. Meyer at the end of 1946 asked some 250 "national producer and commodity organizations" to nonimate "broad-gauge public spirited citizens thoroughly conversant with the operation and problems of the industry each represents"[9] for membership on about 20 commodity committees. These committees were given four functions: 1 to present problems for research and service; 2. to recommend fields of work and their relative importance; 3. to review progress under the Act; and 4. to assist in securing cooperation and understanding of the program by producers and others.[10] The committeemen were chosen "from industry leaders at the executive level"[11] and from producers' cooperatives, quasi-cooperatives, pseudo-cooperatives and farm organizations. Except for some Land-Grant College officials, few if any of the committeemen could be called representatives of science or government.[12] At the

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[6] Early in 1948 Frank B. Jewett, vice-president in charge of development and research for the American Telephone and Telegraph Company, replaced Mr. Kettering.

[7] A graduate of Goshen college, Mr. Meyer was employed from 1921 to 1941 by a large Eastern concern in various positions from office-boy to executive vice-president and general sales manager. During the war he was assistant chief of the WPB's food division and later assistant administrator of PMA. (USDA Press Release 2412-47, Oct. 21, 1947.)

[8] Secretary's Memorandum No. 1199, July 18, 1947.

[9] USDA Press Release 2771–46, Dec. 24, 1946.

[10] Memorandum by E. A. Meyer, Dec. 30, 1947.

[11] This phrase is the National Cotton Council's. Cf. its *Ninth Annual Report of Activities*, Jan. 1, 1948, p. 48.

[12] The membership of the committees is given in *House Hearings on the Agriculture Department Appropriations Bill, 1949*, Part 1, pp. 314–317. (This volume is cited hereafter as: *Approp. Hearings*.)

The dairy advisory committee, which is reasonably representative of the others in composition, is as follows: R. W. Blackburn, Safeway Stores, Los Angeles; Paul F. Sharp, Golden State Company, Ltd., San Francisco; C. W. Earle, producer, Rayville, La.; Frank W. White, Marshall, Minn.; Frank D. Stone, Land O'Lakes Creameries, Inc.; E. W. Gaumnitz, National Cheese Institute, Chicago; A. H. Laut-

same time "working groups" of technicians were created within the Department to advise the commodity committees and to act as liason between the committees and the interested bureaus; the members of the working groups were given no administrative responsibility in connection with the selection of problems for research.[13] An "advisory group" of 10 bureau chiefs was appointed "to cooperate in the formation of over-all policy."[14]

The working of this administrative machinery has been described by Mr. Meyer as follows:

"Let us use the development of a program on potatoes as an example. My assistant, who has charge of the fruit and vegetable field, asks the representatives of the departmental agencies that are interested in potatoes and who have been appointed as a 'departmental working group' on potatoes to develop an outline of the general problems and make whatever suggestions they have as to work they think should be done concerning potatoes.

"They bring together an outline of these problem areas for consideration by the potato committee. This committee (illustrating on a chart) that I mentioned as representing producers, industry, government, and science. That outline is mimeographed in a little pamphlet form. It runs anywhere from 15 to 35 pages and is sent to the committee members 10 days or more before they come to Washington.

"When this committee comes to Washington, these departmental people meet with them part of the time, and part of the time the committee meets in executive session.

"We ask the committee three questions: With the money under the Research and Marketing Act that may be available for potatoes, what do you recommend it to be spent for; that is, in your opinion, what are the most urgent problems? Then we ask them their opinion as to the relative importance of each, a sort of priority listing, so that if there is only so much money, and we know there will be more requests than there are funds, we want their priority recommendations.

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erback, Pure Milk Association, Chicago; Marion Moore, Indiana Condensed Milk Co.; Ken E. Geyer, Connecticut Milk Producers' Association; Dr. T. G. Stitts, H. P. Hood & Sons, Boston; and L. F. Fried, Mid-South Milk Producers Association, Memphis.

[13] Memorandum by E. A. Meyer, March 4, 1948.

[14] USDA Press Release 1966-47-4, Aug. 29, 1947 and Secretary's Memorandum No. 1199, July 18, 1947.

"This committee after meeting and considering the problems leaves with us in written form a statement of their recommendations.

"These recommendations are presented first to the departmental advisory group which is made up of the heads of all the departmental agencies participating in the program and which advises me concerning the administrative feasibility of implementing the committees' recommendations, concerning methods of accomplishing the desired results, of coordinating them with existing work, and so on. These recommendations are then presented to the 11-man National Advisory Committee. This committee reviews the recommendations of the various commodity and functional committees and advises the Secretary and the Administrator of important over-all considerations in the development of a balanced general program of action.

"From here on the recommendations of the various committees are considered as to the manner in which they fit into the over-all program pattern.

"Then the Administrator after the general program is worked out, approves work in particular fields and notifies the appropriate agency to work out the details of operations and to present specific project proposals in line with the funds the Administrator indicates will be available for that particular activity.

"When these proposed projects come back to the Administrator's office, it is my responsibility to see that all of the projects that are in the field of economic research are cleared with BAE. All of the projects that are not in the field of economics are cleared with ARA. . . .

"Then the Administrator approves the project, notifies the agency to get the project underway, and allots money through the Office of Budget and Finance. The National Advisory Committee and the respective commodity functional committee are notified, and we have been informing the public through a press release of project approvals."[15]

More than 90 percent of the 1948 funds were allocated on the basis of recommendations made by the advisory committees, Mr. Meyer told the House subcommittee.[16] This statement of course applied only to funds administered by the Department. Funds

[15] *Approp. Hearings*, pp. 307–308.
[16] *Ibid.*, p. 526. Cf. also p. 305.

granted to the State Experiment Stations are administered under procedures varying somewhat from state to state. In general, however, it may be said that the Experiment Station directors are responsive to pressures from organized agricultural and other interests and are limited by restrictions imposed by the state legislatures.[17]

The Regional Research Fund (see Program 1) is administered by a committee of nine experiment station directors.[18] Only those project proposals which are approved by all stations within a region are forwarded to the Regional Committee for consideration. Thus, a project of particular interest to the South, for example, would not be considered unless *all* Southern stations approved of it in advance.

The terms of the Act and the policy of administration resulted in the following allocations by the Department for fiscal 1948.[19]

Program 2. (Utilization Research)	
a) Developing new and improved uses for agricultural commodities	$2,297,500
b) Improving human nutrition and extending food uses of agricultural commodities	175,000
c) Preservation and improvement of quality and prevention of spoilage between producer and consumer	437,500
Administration	90,000
Total	3,000,000
Program 3 (Research other than Utilization)	
a) Developing new and more profitable uses of resources	538,000
b) Reducing risks in production	412,000
c) More efficient use of farm buildings, houses, machinery and power	280,000
d) Improving the marketing of agricultural products	225,000
e) Improving rural homes and rural life	
Administration	45,000
Total	1,500,000

[17] For the Experiment Station directors' own accounts of these pressures see House Committee on Agriculture, 79th Cong. 2nd Sess., Serial M, *Hearings on Agricultural Research*, 1946, pp. 54–66. Regarding the influences of state legislatures, the head of the Office of Experiment Stations has testified (*Approp. Hearings*, p. 608): "State funds are always earmarked, with perhaps a few exceptions" therefore Federal money "is by far the best money" the stations have.

[18] The membership of the committee is given in *Approp. Hearings*, p. 313.

[19] Adapted from *Approp. Hearings*, pp. 323–324. No similar breakdown of the uses to which Experiment Station funds (Program 1) were put is available. Of the $2,500,000 appropriated for Program 1, $1,800,000 was granted directly to the states, $625,000 was made available to the Regional Research Fund, and $75,000 was allo-

Program 4 Marketing Research and Services)	
a) Developing new market information and basic data....	276,000
b) Developing new and expanded market outlets.....	419,300
c) Reducing marketing costs and margins.....	185,000
d) Developing new standards and grading to improve marketability of farm products.....	206,500
e) Improving marketing methods, facilities, and equipment.....	401,200
f) Developing new processing and packaging techniques.	226,000
g) Analyses of demand and consumer preferences.....	205,500
Administration.....	80,000
Total.....	2,000,000

Most of the Program 2 (utilization) research was in natural sciences. Of the $3,000,000 available, $1,883,900 was administered by the Bureau of Agricultural and Industrial Chemistry.[20] More than one-fifth of the total ($634,500) was devoted to research on cotton utilization. A fairly representative utilization project was officially described as follows:

"To evaluate various commercial methods of processing grains into industrial alcohol and other products, as well as new methods under consideration in industrial plants to determine the economic practicability of large-scale diversions of surplus and low-grade supplies of grain into alcohol products; to examine the economic soundness of such diversions as a basis for programs to stabilize demand for and prices of food and feed grains by providing more flexible market outlets for low-grade, damaged, and surplus supplies; and to promote the integration of such programs with Government price-support and supply stabilization measures."[21]

Most of the work on Program 3 (research other than utilization) was also done by natural scientists but the Bureau of Agricultural Economics got $245,000 and the Production and Marketing Administration got $64,550; most of the BAE and PMA funds were used for marketing studies—this although Program 4 funds were ear-marked solely for marketing, although about 40% of the Program 1 funds were being used for marketing, and although nothing

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cated to the Office of Experiment Stations for administration. The Act required that at least 20% of the total appropriated for Program 1 be used for marketing research; actually about 40% was used for this purpose. Cf. USDA Press Release 465-48, March 3, 1948. The allocations to the Experiment Stations are given by state in *Approp. Hearings*, pp. 337-338.

[20] The allocations by agencies are given in *Approp. Hearings*, p. 330.

[21] *Approp. Hearings*, pp. 324-325.

would remain for Program 3 studies on the item "improving rural homes and rural life." The decision to give marketing studies such heavy emphasis was on the recommendation of the National Advisory Committee.[22]

An example of the work (presumably "service" not "research") done under Program 4 has been given by C. W. Kitchen, executive vice-president of the United Fresh Fruit and Vegetable Association and a member of the National Advisory Committee. Explaining the use to which his association put a $50,000 grant, Mr. Kitchen said:[23]

"So, what we do under a contract with the Department is this: We go into a city and a wholesaler will provide a classroom. He will provide display racks such as you will find in a retail store. He will provide the produce that can be used, and then the retailers are invited to come to that place in small groups of 8, 10, or 12, and we keep the groups small purposely so that each man will get personal attention. They spend the entire day going through each step, from the preparation of these commodities for display to the building of a display, the care of them during the day and overnight, keeping all the records, pricing and all of the steps which are involved in a retailer operating a produce department in a retail store. And I think you would be amazed at the results of this work. Some show increases of 25, 30, 40, and 50 percent in the volume of sales above what they had been getting; some of them report increases as much as 200 percent. We have put 800 through these courses since November 1."

It is of course impossible to itemize what was *not* provided for in the program for 1948. Nevertheless the directions that were taken cannot be appraised without some reference to others that might have been taken. Some of the choices were explicit: the planners deliberately emphasized utilization research at the expense of production research and omitted entirely what might be termed "welfare" research. These choices were made at the level of consciousness; other choices, perhaps, were made somewhere below that level, in the realm of the taken-for-granted. Certainly it is noteworthy that the whole complex of issues and problems raised by

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[22] USDA Press Release 1633-47, July 24, 1947.
[23] *Approp. Hearings*, p. 539.

Sir John Boyd-Orr's statement, "It is not the atomic bomb but the food crisis that may destroy us",[24] or, in still another very large sphere, by T. W. Schultz' question, "How efficient is American agriculture?"[25] should be beyond the planners' range of awareness or interest.

To understand why the planners' apperception mass exhibited one contour rather than another it is necessary to turn now to social forces in the background.

II

When the House Committee on Agriculture began its hearings on research in June 1946 there were two important bills before it. One (H.R. 6548) was introduced by the chairman of the Committee, John W. Flannagan of Virginia, and the other (H.R. 6692) by the ranking minority member, Clifford R. Hope of Kansas. During the hearings these two bills were merged to become titles one and two respectively of H.R. 6932, which became the Research and Marketing Act.

The genesis of the two original bills, one coming from the Democratic and the other from the Republican leadership, lay in quite different circumstances.

All but two of the Democratic majority on the Agriculture Committee were from Southern states. The majority was therefore concerned with cotton. The Chairman, Mr. Flannagan, was concerned with cotton but particularly with tobacco. Both cotton and tobacco had been chronically in surplus and their post-war prospect was extremely poor.

In 1944 the then chairman of the Committee had appointed a subcommittee under Representative Stephen Pace of Georgia to study the post-war position of cotton. At Mr. Pace's request, the National Cotton Council, an organization of cotton growers, ginners, merchants, warehousemen, spinners, and cottonseed crushers formed in 1938 to promote the use of cotton, sponsored a meeting of persons interested in cotton research. At this meeting, held in Memphis in May 1945 ,"an adequate long-term program of research on the production and utilization of cotton was accepted as a basic

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[24] *New York Times*, May 19, 1948.
[25] This JOURNAL, 29: 3 (August 1947), pp. 644–658.

and essential feature of any real solution of the cotton problem. . . . "[26]

Research on cotton had not figured in a plan which the Bureau of Agricultural Economics had lately developed for the Pace subcommittee's consideration.[27] The BAE plan, which was also intended as a real solution of the cotton problem, proposed that the price of cotton be allowed to fall to world levels and that, for a period of five years while cotton growers were reorganizing their enterprises according to a planned diversification, farmers be paid a direct subsidy which would be less each year and finally taper off altogether. This plan was not popular with the leaders of the National Cotton Council, and, with other causes, it resulted in a severe curtailment of BAE at the hands of Congress.[28]

Following the meeting at Memphis, the National Cotton Council and the Southern experiment station directors, with the advice of the U. S. Department of Agriculture, the farm organizations and other interested parties, drafted a bill which, after it had been expanded "with the cooperation and guidance of Land-Grant colleges and farm organizations representing every part of America" to include not merely cotton but all agricultural products, became H. R. 6548.[29]

Representative Hope's bill to provide marketing research and services arose out of his belief that marketing improvements might make "action programs" unnecessary. "A lot of us would like to see it (the surplus problem) handled in such a way that the Government would not be in it," Mr. Hope explained during the hearings,[30]—"that it be worked out through research, that new uses, new purposes, and new methods of marketing be developed with the result that we absorb these extra products." This view was shared by other Mid-western farm leaders. "Research offers the only possibility we can see for cutting down the necessity of expenditures for action programs . . . ," the National Grange declared.[31]

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[26] Walter L. Randolph, a director of the National Cotton Council, in *Agricultural Research*, Serial M, House Committee on Agriculture, 79th Congress, 2nd Session, 1946, p. 105.

[27] *A Conversion Program for the Cotton South*, (mimeo'd), Washington: 1945.

[28] Cf. Charles M. Hardin, "The Bureau of Agricultural Economics Under Fire," this JOURNAL, 28: 3 (August, 1946), pp. 635–668.

[29] Walter L. Randolph, *op. cit.*, p. 106.

[30] *Agricultural Research, op. cit.*, pp. 198–199.

[31] This statement was made after the passage of the Act, *Senate Hearings on Agriculture Department Appropriations Bill*, 1948, p. 752.

The bill got ardent support from some who were moved by quite different hopes and fears. The processors and distributors of foods, particularly the United Fresh Fruit and Vegetable Association,[32] were anxious to establish closer ties with the Department. Likewise the National Association of Commissioners, Secretaries, and Directors of Agriculture (the members of which are "keenly aware of all political implications as they affect the general economy")[33] supported the bill because its marketing features would expand their functions. Their representative W. Kerr Scott, commissioner of agriculture for North Carolina, explained the background:

"There was introduced several years ago a bill known as the Bailey Bill, and that asked for funds for marketing in the various departments of agriculture. The land-grant (colleges), the Extension Service, the research people, together with the Farm Bureau, jumped on that bill and killed it for the simple reason that they said it did not include them in the program.

"So, we said all right, we are not trying to keep you out of the program. So, the Cooley-Bailey bill was introduced and for some reason or another they killed it, saying they were not properly in the program. And they said the program should include all three. So there was introduced a bill proposing to include the Extension Service, the research people, and the marketing division in the various departments of agriculture, and in doing that why they wind up by certain provisions being put in H.R. 1690, asking for their funds separately, and they got it after killing ours, when we asked it, using the Farm Bureau to help see that it should be included. . . ."[34]

Seven directors of state experiment stations testified. They maintained that funds for research in the states should be available only to the experiment stations; the state departments of agriculture should be confined to marketing services. This division of labor preserved the traditional pattern, as did the provision of the bill centering Federal research in the field of utilization.

[32] This association has been described by its executive vice-president, C. W. Kitchen, as "a national organization whose members reside in every state and in several provinces of Canada. This include shippers—many of whom are both producers and distributors—cooperative marketing associations, brokers, jobbers, wholesalers, and representatives of allied industries . . ." (*Long-Range Agricultural Policy*, Hearings of the House Committee of Agriculture, 80th Cong. 1st Sess. Part 3, p. 289.

[33] *Long Range Agricultural Policy, op. cit.* Part 2, pp. 175–176. At its annual meeting in 1946 the association commended W. Kerr Scott for his "persistent and untiring efforts" to obtain the legislation.

[34] *Agricultural Research, op. cit.*, p. 169.

With this backing, and without a word of criticism having been directed against it (the members of the Committee on Agriculture, all from farm districts, were among the most vigorous proponents of the legislation), H.R. 6932 was passed without a dissenting vote.

Background Forces

Farmers turned to science only when they reached the end or the frontier of free land; since that time, however, the dominant interests in agriculture have shaped agricultural research policy. When Connecticut farmers found it necessary to to use fertilizer, the first experiment station was established (in 1875) to make tests of the unreliable product then on the market. In 1887 (three years before the Census declared the frontier closed) the Hatch Act established experiment stations as divisions of the Land Grant colleges and gave them Federal support. At this time the agricultural research of the Federal government was devoted chiefly to soils and fertilizers, the composition of plants, food and drug adulteration, and the manufacture of sugar.[35]

After 1890 the impact of the city, the machine, the laboratory, and the market-place was profound. Farmers in the better land areas were soon keeping books and calling themselves businessmen; indeed the Adams Act of 1906 authorized further research on the "agricultural industry" of the United States. Liberty Hyde Bailey believed a new and distinctive rural culture would flower from agricultural science. "The leadership in rural affairs," he wrote in 1908, "is rapidly passing to the interests that associate themselves with the agricultural colleges and experiment stations. In twenty-five years there will be a new political philosophy of the open country born out of these institutions."[36]

The new political philosophy appeared somewhat ahead of schedule but it turned out to be of a kind that rejected the "uplift" in Bailey's country life movement. The "farm businessman" was not in the least bit sentimental about agriculture as a way of life. He wanted to make money. Agricultural science was put to his

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[35] Cf. Paul H. Johnstone, "Old Ideals Versus New Ideas in Farm Life," *Farmers in a Changing World*, pp. 111–167, and A. C. True and V. A. Clark, *The Agricultural Experiment Stations in the United States*, Bulletin No. 80, Office of Experiment Stations, 1900.

[36] *The State and the Farmer*, New York: 1908, pp. 15 and 168.

purpose; "making two blades of grass grow where one grew before" was its slogan.

After the World War (in 1920) there was a sharp break in farm prices. Now the farmer needed a science that would tell him not merely how to produce but how to make money as well. W. J. Spillman became a leading figure in the Department; in 1922 the Bureau of Agricultural Economics was organized, and in 1925 the Purnell Act was passed. At the same time, the farm organizations were growing in strength, acquiring professional, urbanized leadership, and establishing offices in Washington. By 1930 the states had received about $9,600,000 under the Purnell Act and nearly one-half of this had been used for investigations in economics, rural sociology, and home economics.[37]

From 1925 to 1930 the experiment stations made 463 studies in economics. Of these 162 had to do with marketing. The spread between what the consumer paid and what the farmer received had long been a grievance to both farmers and consumers[38] and in the late '20's the idea grew that this price spread was the source of most of the farmer's ills. The act establishing the Farm Board in 1929 declared it "the policy of Congress to promote the effective merchandising of agricultural commodities in interstate and foreign commerce, so that the industry of agriculture will be placed on a basis of economic equality with other industries."

While surpluses mounted in the early '30's, farmers put marketing at the top and production at the bottom of their list of needs.[39] Experiment station directors talked of their achievements in reducing production,[40] but at the same time they jealously guarded the vested interest they had established in production research. "The state experiment station has gained the moral and political support of the state by its service to local interests," an official

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[37] Walter H. Evans, "The First Five Years of the Purnell Act," *Proc. of the 44th Ann. Conv. of the Assoc. of Land-Grant Coll. and Univ. 1930* (published 1931) pp. 224–231.

[38] J. D. Black and M. E. Kiefer, *Future Food and Agriculture Policy*, 1948, p. 156.

[39] H. C. Ramsower, "What Changes in Extension Programs Are Demanded by the Present Agricultural Depression?", *Proc. of the 45th Ann. Conv. of the Assoc. of Land-Grant Coll. and Univ.* 1931, (published 1932) p. 304.

[40] In 1932 Director F. B. Mumford of Missouri cited the experiment station's advice to farmers to dispose of about one-third of all cows being milked. "Clearly, this would greatly decrease the production of milk," he said, "would relieve the farmer from losses which he now experiences, and increase not only the profit per cow of the animals remaining but his total profit. . . ." *Proc. of the 46th Ann. Conv. of the Assoc. of Land-Grant Coll. and Univ. 1932* (published 1933), p. 259.

committee reported in 1931. " . . . if local control of its functions were to be divided by any competitive influence the experiment station would rapidly lose its leadership and the confidence of the people. A disastrous reduction of financial aid from the state would follow."[41] The Farm Board and the AAA strengthened the farm organizations and the processors and distributors. Commodity organizations (the American Farm Bureau and many of its state affiliates set up commodity departments during the '30's) came to represent "producers" or "growers" of this or that commodity; if there were any "farmers" left, they were virtually unrepresented. During the war, distributors (including Mr. Meyer, the Administrator of the Act) assumed important places in the Department. There were charges that the Department, in which the producers were supposed to have a proprietary interest, had been turned over to the distributors, but the fact was that producer and distributor interests had become almost indistinguishable. It was not surprising that the word "farmer" did not appear anywhere in the Research and Marketing Act.

Chemurgy

According to Wheeler McMillen,[42] president of the National Farm Chemurgic Council. Inc, and editor of the mass-circulation *Farm Journal* and *Pathfinder*, farm chemurgy (industrial utilization of farm-grown materials) came into existence one night in 1924 when he heard the president of the United States Chamber of Commerce tell a meeting of the American Farm Bureau Federation: "Unfortunately the human stomach is not elastic." Three years earlier McMillen, then an Ohio hog-farmer, had been caught in the price break. Now, as a farm editor, he found no one could discuss the condition of farm business without talking about surpluses. The Chamber of Commerce president's remark suggested an idea which soon became a crusade.[43]

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[41] "Report of the Committee on Federal-State Relations in Research," *Proc. of 45th Ann. Conv. of Assoc. of Land-Grant Coll. and Univ. 1931*, (published 1932), p. 521.

[42] The account of the Chemurgy movement given here is based, except as otherwise noted, on Wheeler McMillen, *New Riches from the Soil*. (D. Van Nostrand Company, New York: 1946). The book is a remarkable exposition of the mentality and technique of a gifted mass-manipulator.

[43] McMillen says that chemurgy is not a "major panacea" but "if sedulously applied, (it) will effect more complete cures for economic and social ailments than the remedies applied so far by the statesmen" (*op. cit.*, p. 3). His associate, Dr. William

McMillen spent most of 1926 talking to scientists and others about his idea for the industrial utilization of farm products. He found the Department of Agriculture scientists not at all enthusiastic.[44] Secretary of Agriculture Jardine referred him to Secretary of Commerce Hoover. Hoover thought the idea was sound and the next Congress (perhaps by coincidence, McMillen says) got a request from Hoover for $50,000 to be used by the Bureau of Standards in testing industrial uses of farm products. Secretary Jardine may have been moved to action too (although McMillen says nothing of this) for in 1927 he assigned a scientist to survey the possibilities of increasing the industrial use of farm products.[45] In 1930 the Forest Products Laboratory was taken as a precedent for the establishment of an Agricultural By-products Laboratory at Ames, Iowa, which was to study the possible uses of cornstalks, bagasse, cotton stalks, cotton seed, cotton hulls, cotton lint and linters, and rice.[46]

Meanwhile McMillen and a fellow-editor, Clifford V. Gregory, were publicizing the industrial-use idea in their magazines and McMillen wrote resolutions on the subject which were adopted by both the Grange and the Farm Bureau. Dr. William J. Hale, a consultant for the Dow Chemical Company and a writer for Henry Ford's *Dearborn Independent*, joined McMillen in the crusade. Working together, the journalist and the scientist (Hale was chairman of the organic chemistry committee of the National Research Council) found they could get articles published in *Colliers* and elsewhere. In 1929 McMillen published a book, *Too Many Farmers*, and in 1934 Hale published *The Farm Chemurgic*, which was widely distributed by the Chemical Foundation, an organization established by the government to receive the income ($18,000,000) from German chemical patents confiscated during the war. Francis

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J. Hale (in *The Farm Chemurgic*. The Stratford Company. Boston: 1934) has made chemistry the central principle of existence: "There is naught else but a chemical world and we are adrift on a chemical sea. . . ." (*op. cit.*, p. 126).

[44] One of the USDA scientists virtually recommended that he spend his time on something more fruitful, McMillen writes, (*op. cit.*, p. 23) but "It is only fair to add that a dozen years later, after some millions of dollars had been appropriated for chemurgic research, this gentleman became one of the ablest and most enthusiastic of advocates."

[45] This study appeared as a book: George M. Rommel, *Farm Products in Industry*. New York: 1928.

[46] See "Establishment of a Laboratory for Utilization of Waste Agricultural Products," Serial G, *Hearings*, House Committee on Agriculture, 71st Congress, 2nd Session, 1930.

Patrick Garvan, the president of the Foundation, not only subsidized the distribution of Hale's book but also financed the Farm Chemurgic Council into its third year (1937) at a cost of about $125,000 a year. The Council was organized at Dearborn at a conference of agriculture, industry and science which was sponsored by Ford,[47] the national farm organizations, and a committee headed by the editor and publicist, Gregory.

"For two days speakers described present and possible developments in chemurgic types of research and industry," McMillen has written.[48] "Network and local radio broadcasts and excellent news coverage carried the story over the country and aroused interest far beyond the attendance. Col. Frank Knox, Irénée DuPont, Dr. Karl T. Compton were among the more eminent speakers. Mr. Ford signed the check for a luncheon to the entire group and put a fleet of automobiles at the disposal of those of us who were directing the affair. . . .

"Garvan announced that the Chemical Foundation would pay the expenses of the organization for one year. Fritsche immediately opened an office at the Dearborn Inn, a good place from which to capitalize on the success of the conference. The Sears-Roebuck Company paid for printing several thousand copies of the conference proceedings, which, when distributed, attracted the interest of many new people, especially among farmers. Every Grange in the country received one.

"Dr. H. E. Barnard, a chemist and a good speaker, joined the staff as a science advisor. Hugh C. White took charge of publicity, and other help was employed.

"A demand soon arose for local and regional conferences. Meetings were held at Pensacola; Beaumont, Texas; Jackson, Miss; Macon, Ga; Alexandria, La; Fresno; Omaha; and elsewhere. Usually these were two-day sessions with plenty of time for agricultural scientific, and business people to discuss fully the chemurgic possibilities of their areas. More than one permanent convert was won by putting him on a program where he talked himself into an enthusiastic conviction."

So great was the interest aroused by this promotional campaign

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[47] "Ford's name on the invitations had made them important," McMillen explains, p. 33.

[48] McMillen, *op. cit.*, pp. 33 and 35–36.

that the second and third annual chemurgic conferences had to be moved from the Dearborn Inn to a downtown Detroit hotel.

According to McMillen:

"The national and regional conferences all received generous treatment from the press and radio. The news purveyors recognized an interesting new idea. They saw that important national and local names were conspicuous in the meetings. They sensed the presence of controversy. Whoever read the papers closely began to be conscious of chemurgy. Proceedings and papers were distributed extensively to prominent people. Where a seed might fall and sprout was unpredictable."[49]

One of the seeds sprouted (McMillen goes on to explain) in the mind of Senator Theodore Bilbo in whose state of Mississippi one of the conferences had been held.[50] Bilbo drafted a bill to provide a Federal utilization laboratory for Mississippi; later he redrafted the bill to provide a total of $4,000,000 for four laboratories, one for each major region of the country.[51] Bilbo's proposal reached a conference committee as an amendment to the AAA act of 1938. An administration leader, possibly Secretary Wallace, suggested to the committee that the amendment be redrafted to provide $100,000 for a survey of the need for such laboratories. By a clerical error, both the $4,000,000 for the laboratories and the $100,000 for the survey were included in the Act.[52]

The AAA Act directed the Secretary to establish the four laboratories. Accordingly he appointed a special staff of scientists to decide upon the locations of the laboratories and to plan the research to be carried on in them. The staff visited every state and interviewed representatives of about 1300 research laboratories, educational institutions, and agricultural organizations. At the same time it reviewed more than 10,000 research projects which had already been undertaken in the general field of utilization. In

[49] *Ibid.*, p. 299.

[50] The National Cotton Council may possibly have received some of its inspiration from this conference. The Council was organized by Oscar Johnson of Mississippi in the same year, 1938. At any rate, the two councils, Cotton and Chemurgic, are now close together, as evidenced by the fact that Wheeler McMillen was a speaker at the Cotton Council's 10th Annual Meeting in Atlanta, Jan. 21–23, 1948. The Cotton Council passed a resolution commending McMillen for his "unparalled" contribution to agriculture through the chemurgic movement.

[51] Bilbo's proposal would also have provided $1,000,000 for marketing and merchandising activities. *House Hearings on Agriculture Department Appropriation Bill, 1940*, p. 444.

[52] McMillen, *op. cit.*, p. 301, See also T. Swann Harding, *Two Blades of Grass.* (University of Oklahoma Press: 1947) p. 53.

1939 Secretary Wallace transmitted a book-length report of this study to Congress.[53] The report revealed no enthusiasm for the new laboratories. It pointed out that "in our young and dynamic nation research patterns which fit today's needs are unlikely to satisfy the needs of the future." "One certain and permanent value of the laboratories," it concluded, "will rest on the fact of their physical existence."[54] Dedicating one of the laboratories, Mr. Wallace said, "If we expect the fantastic dreams of the chemurgic leaders to be realized in the near future, then we are bound to be disappointed. But if we are patient and look farther ahead we can expect helpful results from the work of the laboratories."[55]

The passage of the legislation creating the regional laboratories took the state experiment stations by surprise. Meeting late in November 1938, the station directors considered the new situation.[56] R. E. Buchanan of Iowa, speaking on the subject, "In What Ways Can the State Agricultural Experiment Stations Advantageously Undertake Research in the Industrial Utilization of Agricultural Products?", concluded, "The public has demanded and Congress together with both parties, farm organizations, Farm Chemurgic, and many individuals have approved investigations in this field. Although public clamor for a particular course of action scarcely proves its desirability in anything other than a political sense, there does seem to have been enough careful study by competent scientists to warrant the conclusion that research is needed on the industrial utilization of agricultural products." Another speaker reported that $16,000,000 would be needed for industrial utilization research. If only $4,000,000 of this went to the regional laboratories, might not the experiment stations advantageously use the remainder?

Far from being satisfied with the four Federal laboratories, the Chemurgic movement went on to greater things. In 1939 Dr. Hale published another book in which chemurgy was mixed with adulation for Adolph Hitler and contempt for decadent, unscientific democracy.[57] The National Farm Chemurgic Council opened

[53] *Regional Research Laboratories*, Senate Document 65, 76th Congress, 1st Session, 1939.

[54] *Ibid.*, pp. 9 and 403.

[55] Quoted by McMillen, *op. cit.*, p. 302. "No one could entirely deny Mr. Wallace's jibe," McMillen says of this guarded statement.

[56] *Proc. of the 52nd Ann. Conv. of the Assoc. of Land-Grant Coll. and Univ, 1938*, (published 1939), pp. 181 and 186.

[57] William J. Hale, *Forward March*. Coward-McCann Inc., New York: 1939, p. 202ff.

offices in Columbus, Ohio and in the Empire State Building. These offices are managed by the Council's full time secretary and treasurer, each of whom has a staff of assistants. The Council publishes *Chemurgic Digest* semi-monthly and maintains an Information File Service which mails six to eight thousand reports monthly. There are branches of the movement in most states and in several foreign countries; associate members pay $10 a year, while contributing members, mostly corporations, pay dues "in three figures." A Board of 31 Governors directs the policy of the Council.[58]

III

The research and marketing program may be regarded as the product of an ideology, a mode of thought directed toward the maintenance of the existing order.[59] To solve the surplus problem in a certain manner (e.g., by maintaining high mass purchasing power while effecting production adjustments such as BAE proposed for cotton) would entail consequences offensive to the dominant interests in agriculture and other segments of the economy. From a field of vision structured by the wish to maintain the status quo, the research and marketing program appears as a happy solution to a painful problem—a solution which partakes of some of the most popular symbolism (since it goes under the name of science and efficiency), violates no prejudices, and poses no con-

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[58] See McMillen, chapters XX "Chemurgy Reaches the Grassroots" and XXI "How the Chemurgic Council Works." The membership of the Board of Governors is listed pp. 349–352. The representatives of agriculture are of course all businessmen; they include, for example, Cornelius J. Claassen, whose company operates 1300 farms for other owners and D. Howard Doane of *Doane Agricultural Service*. Among the representatives of science are some distinguished names, including Karl T. Compton and Robert A. Millikan.

[59] The study of bias becomes the Sociology of Knowledge only when the situationally-bound nature of the observer's perspective, as well as that of the observed, is set forth. Accordingly it is incumbent on the writer to make his own bias explicit as well as he can.

The underlying reality here is the surplus problem. Unlike Wheeler McMillen (who knew that "millions of human stomachs around the world were insufficiently filled" but saw in this "conditions . . . not markets" *op. cit.* p. 20.), the writer sees in it an opportunity, not a threat—he sees an opportunity for widespread consumption programs (insufficiently filled stomachs make a powerful emotional appeal on him), for taking measures to expand the industrial economy to the point where it will absorb underemployed farm people and, (and here the emotion is very strong) for a reorganization of the Southern economy which will improve the position of the Negro. Thus the writer's point of view is what Mannheim called Utopian, i.e. incongruent with reality because oriented toward changing it.

Although he has the very important advantage of being aware of his bias, the writer's criticism of opposing ideologies is probably closer to the objective reality than would be any proposals that might arise from his own view.

ceivable threat to the existing economic, social and political order.

That it arises from this interest-bound source by no means invalidates the idea of the program; on the contrary, it may derive a unique value from this origin. The question can only be decided by an examination of what it leads to in action. Can laboratory research make an important contribution to the solution of the surplus problem? Can marketing research and services significantly expand the market? In short, is the program congruent with the nature of science and the underlying realities of the situation toward which it is directed?

Program and Reality

There is serious reason to doubt that the surplus problem will be solved in the laboratory.

Only a few industries (fuel, paper, and building) could absorb any appreciable portion of the basic crops.[60] Yet to achieve a significant result, uses must be found for enormous volumes; hundreds of successful projects (like that which produced the drug rutin from buckwheat) would have virtually no effect on the surplus problem. Moreover, to displace a raw material now in use a farm product must offer an economy. It is possible to produce alcohol from grain, but it is cheaper to produce it from petroleum or wood. To suppose that chemistry can drastically alter the ratio of costs is unwarranted. Because the tendency is for less costly to replace more costly materials, agricultural products will doubtless continue to lose ground rather than to gain it.[61] Indeed, if chemurgy were to succeed (if

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[60] W. H. Cook, "Industrial Uses of Agricultural Products," *Agricultural Institute Review*. (Ottawa) 1:5 (May 1946) pp. 363–368. In the only critical discussion of this question by a natural scientist that the author has been able to find, Dr. Cook, the director of applied biology at the National Research Laboratory at Ottawa, says that the best prospects lie in finding new crops which are adapted to industrial uses and in finding new uses for wastes. He takes a dim view of the notion that existing surpluses can be used industrially at a profit to the farmer.

The only critical discussion by a social scientist, so far as the writer can discover, is that by T. W. Schultz in this JOURNAL: "Economic Aspects of New Industrial Uses for Agricultural Products," 20:1 (Feb. 1938), pp. 134–139.

In answer to an inquiry from the writer, E. G. Moore, Coordinator of Research Publication for the Agricultural Research Administration, wrote on May 28, 1948: "So far as I know, no one has questioned the desirability of research on utilization and marketing. I presume, however, that someone, somewhere, would question anything attempted by the Federal government."

[61] For evidence that they are losing ground see F. L. Thomsen, *Marketing and Transportation Situation*, BAE, Nov. 1945, p. 8. Also "Industrial Utilization of Farm Products," *Technological Trends and National Policy*, National Resources Committee (June 1937) pp. 130–131.

potatoes were to replace wood as a source of alcohol, for example) it could only be because agriculture had become so "efficient" that the farm population could be almost altogether dispensed with.

Whatever successes are achieved in utilization research are likely to add to the surplus of one crop while subtracting from that of another.[62]

That the Department is sceptical of what may be accomplished along these lines in the laboratory may be seen from the fact that it now recommends subsidies to make industrial diversions feasible. "Some of those industrial uses would be valuable primarily as a matter of national defense," a Department spokesman testified not long ago.[63] "Others of these uses, however, could with a bit of aid in the early stages, stand on their own feet under normal conditions. The encouragement of this latter group should be undertaken as an aid to agriculture, particularly as a market for large surpluses."

One may doubt that the surplus problem will be solved in the laboratory. In any case, it would seem that research of this kind is essentially no more appropriate a solution to the surplus problem than would be research directed toward finding new uses for, say, shoes, if shoes happened to be produced too abundantly in our

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[62] For example: while the USDA makes an elaborate effort to find new uses for cotton, it also conducts research: 1. on zein (the alcohol-soluble portion of corngluten) for the production of a zein fibre; 2. on residues such as straw for (among other things) a sugar, xylose, which can be converted into furfural which may serve as a raw material in the manufacture of nylon; 3. on feathers, which can be mixed with wool, nylon, or rayon (but apparently not cotton) or converted by chemical treatment into a synthetic protein fibre; 4. on oilseed byproducts, from the proteins of which fibres may be made; 5. on milk, for casein fibres to be used in textiles; 6. on wood and wood wastes, for paperbags which will compete with cotton.

The complexity and importance of the interrelations within the agricultural segment of the economy may be seen from the following: "Farmers of the Corn Belt had traditionally followed a corn-oats or corn-oats-clover cycle. The rapid disappearance of the horse from the American scene seriously restricted the market for oats. The possibilities of soybeans as a replacement crop were known to some feed manufacturers and to the Department of Agriculture and the midwestern experiment stations. A vigorous extension campaign and careful selection of suitable varieties resulted in an increase in production from 8 million bushels in 1928 to about 80 million bushels in 1939. The market absorbed this new crop readily, but its products go mainly into the food and feed markets, where they compete directly with cottonseed products. The only discernable remedy for this situation is to discover, through research, other destinations for the soybean crop than the nonexpansible human or animal stomach, and on this the Urbana laboratory is working." Van Arsdel, W. B. "The Industrial Market for Farm Products," *Farmers in a Changing World, the Yearbook of Agriculture*, 1940, p. 609.

[63] *Long-Range Policy, op. cit.*, p. 154.

economy. That subsidies should be recommended for this purpose is of course ominous.

The case is even plainer with the marketing program. It will not increase the amount that consumers have to spend. At best, then, it can only persuade them to spend more for food and less for other things, or more for some foods and less for others, a process which cannot possibly solve the surplus problem. Indeed merchandising tricks like advertising and fancy packaging will actually reduce the volume of food sold by adding to its cost. As to economies that may result from "efficiency" brought about by the program,—"I do not want to over-emphasize those possibilities," C. W. Kitchen, one of the marketing program's most ardent advocates, has said.[64]

One might think that the traditional, "two blades of grass where one grew before" type of research would not suffer from this ideological bent. But recently the National Advisory Council recommended: "that production research place emphasis upon the maintenance of desirable balances between plant and animal products and between individual commodities consistent with the demand for such commotities and the conservation of natural resources."[65] Whether this is indeed a feasible basis upon which to plan a program of production research may also be doubted.

The Role of the Scientists

Within its inherent limitations, the program will be more or less fruitful depending, among other things, upon the effectiveness with which it uses scientists, and, through them, science itself. The ideology underlying the program must therefore be examined in this new relation.

Here the testimony of scientists themselves should be of value. It should be noted, however, that this value is very significantly qualified by the fact that the scientists who participate in policy formation are administrators as well as scientists. An agricultural scientist, said Harvey W. Wiley, one of the earliest and best of them, is one who knows how to make two dollars grow on an ap-

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[64] *Long-Range Agricultural Policy, op. cit.*, pp. 293–294. It is interesting to note that the BAE, in its *Study of Selected Trends and Factors Relating to the Long-Range Prospect for American Agriculture*, expects the reduction of marketing charges will be a "difficult task" despite the marketing program (*ibid.* p. 56). Cf. also the opinions of O. H. Brownlee in this JOURNAL (Feb. 1948, p. 68) and of William H. Nicholls in the same issue.

[65] USDA Press Release 834–48 (April 22, 1948).

propriations bill where only one grew before.[66] Moreover, apart from this, most agricultural scientists—both natural and social scientists—are employed by public agencies,[67] state or Federal, and therefore are not at liberty to speak their minds in full. The example of BAE is before them.

In their testimony before Congressional committees the natural scientists generally find it safer to use words without meaning or to exploit the prejudices and preconceptions of their listeners. Thus Dr. Lambert, head of the Agricultural Research Administration, advises the appropriations subcommittee: "The best world, I believe, will be one in which farmers and scientists are tooled up to meet emergencies as they may arise. Now, I think that in addition to possible emergencies it is just good business to keep our plant tooled up so that we are getting facts that will help the farmer as much as possible at all times."[68]

When the natural scientist in the Department does speak seriously, and as a scientist rather than a publicist, he never fails to point out the importance of fundamental as opposed to applied research. "In our desire to find quick answers to puzzling problems," Dr. Lambert testified recently, "we must bear in mind that the progress of applied research is determined by the support given fundamental research. We must not expect science to serve as an instrument of policy, rather we should look to science to increase our knowledge and look to policy as an expression of how

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[66] Harvey W. Wiley, *An Autobiography*. Indianapolis: 1930, p. 193. Thus Dr. R. W. Trullinger, the chief of the Office of Experiment Stations, reports to the appropriations subcommittee that the stations have used 40% of the 1948 Research and Marketing Act allotment (twice the proportion required) for marketing research, a use necessitated by impending surpluses, and at the same time urges an increase in funds for 1949 on the ominous grounds that "farmers are faced with the necessity of continuing production at unprecedented high levels in order to meet world needs for food and fibre. This means continuation and intensification of high-pressure production practices by all means available including especially the adoption of all known measures for increasing efficiency in the production and utilization of food, feed and fibre." *Approp. Hearings*, p. 598.

[67] In a paper given before the Farm Economics Association in 1939 (This JOURNAL 21:1, p. 8), H. R. Tolley observed that over 100 of the 116 agricultural economists attending the association's meeting were on the public payroll. Charles E. Kellogg has called attention to the fact that most natural scientists in agriculture are employed by public institutions. ("What is Farm Research?", *Science in Farming, the Yearbook of Agriculture* 1943–1947, p. 22.)

For an illuminating discussion of some problems in the formulation of social science research in agriculture see Charles M. Hardin, "Programmatic Research and Agricultural Policy," This JOURNAL 29:2 (May 1947), pp. 371–374.

[68] *Approp. Hearings*, p. 566.

we want to use our knowledge. Even in applied research we cannot buy results like beans in the corner store. . . . Some dollars and some projects may never produce the answers we are looking for. . . . "[69]

While the scientist-administrators of the Department unfailingly point out the need for fundamental research, they are also quick to rationalize, in the name of democracy, their subservience to the demands of pressure groups for applied research. "Sometimes," writes Charles E. Kellogg of the Bureau of Plant Industry, Soil, and Agricultural Engineering,[70] "items of popular interest receive undue emphasis at the expense of more important fundamental research. . . . " (Dr. Kellogg's own bureau spent $63,900 on fundamental and $7,142,400 on applied research in 1947) " . . . but," Dr. Kellogg continues, "on the whole the agricultural research program has benefitted from this procedure; *it has been forced to keep close to the real problems of the people.*" (Italics added.) Having supplied this justification, Dr. Kellogg goes on to speak of what concerns him as a scientist: "Thought must be given to ways for broadening the scope of individual appropriation items to allow greater discretion to the scientists themselves; holding scientists accountable for their use of public funds; and avoiding unreasonable dictation as to what the scientists shall investigate."

To a Congressman or a pressure group representative, a scientist is no different from other not-very-well-paid employees—he ought to expect to take orders from the person who pays him and to be fired if he doesn't produce results. Congressman Clarence Cannon, as chairman of the House Appropriations Committee, pointed out with amazement that the Department actually retained on the

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[69] *Long Range Agricultural Policy, op. cit.* p. 57. According to William H. Nicholls (this JOURNAL, *op. cit.*) it will be "inexcusable" if fundamental research in marketing is not done under the Act.

To the writer it seems that science must serve as the instrument of policy, for the notion of "science for sciences' sake" is absurd. The real question is what policy (i.e., directed by whom and toward what objectives) will result in the greatest short and long-run returns. While the scientists' unanimity on the importance of fundamental research is impressive, it ought not to be accepted uncritically. The subject is one that will bear a great deal of investigation.

[70] "What is Farm Research?" *Science in Farming, op. cit.*, p. 24. For another instance of this kind of rationalization, see the Department's statement in The President's Scientific Research Board, *Science and Public Policy*, Vol. II. "The Federal Research Program," p. 111. In this report (p. 114) the Department's expenditures for fiscal 1947 are broken down by Bureau and by type of research. The totals are as follows (in thousands): "fundamental" $2,471.1; "background" $10,728.2; "applied" $13,711; and "development" $4,417.4.

payroll scientists who did not produce the desired results in what the Congressman considered to be a reaonsable length of time.[71] Recently a member of the National Advisory Committee—Robert R. Coker, vice-president of Coker's Pedigreed Seed Company and a director of the National Cotton Council—told Mr. Cannon that the Advisory Committee had arranged to get from Mr. Meyer a list of the research projects by geographic area so that the committeemen can "look in on the man doing the work and try to form our own opinions as to its value." This sounded like a good idea to Mr. Cannon. "By all means," he said, "It is difficult to see how you could effectively judge what is being done unless you did look into it personally."[72]

Conclusion

What conclusions may be drawn from the Sociology of Knowledge for use in planning agricultural research? The first is that bias ought to be made explicit. Every perspective has its societal setting and therefore complete objectivity is quite impossible of attainment. The closest we can come to objectivity is to understand our biases and to compensate for them deliberately. Bias may be fruitful, while objectivity, if it could be attained, would be sterile for many purposes. There is no absolute truth; there are only "relational truths;" these consist of relations among the situationally-congruent elements of various perspectives. Thus it is by self-conscious examination of widely different biases that we are most likely to arrive at truths having predictive value.

This means that Congressional committees ought to include some members who do not depend on farm support[73] and that (like the courts with their public prosecutors and the Church with its Devil's Advocate) they should take pains to hear witnesses who

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[71] *Approp. Hearings*, p. 576. See the same point of view expressed by Representative Whitten, *ibid.*, p. 805, and Representative Andersen, *ibid.*, p. 808. In the House Hearings for fiscal 1940 (p. 168), see Representative Lambertson's proposal that the USDA research facilities be abolished and prize-essay contests substituted.

[72] *Ibid.*, pp. 527–528.

[73] "I do not know that there has ever been an instance since I have been around Washington when anyone not from an agricultural district or agricultural State has been given an assignment upon the Agriculture Committee in the House or Senate," Senator White of Maine remarked not long ago. "I am just wondering," he went on, "whether, as a matter of principle we ought to have a representative of the consumers upon the Agriculture Committee . . ." *Organization of Congress*, Hearings of Joint Committee on Organization of Congress, 79th Cong. 1st Sess., 1945, p. 882.

will present the case *against* as well as for. Scientists who have no connection with agriculture or with institutions dependent upon appropriations ought to participate as consultants in the planning of agricultural research. There should be an end to administration by pressure groups.[74] The planning process ought to tbe administered by persons trained in the traditions of the scientist and the public servant and trained, too, to recognize biases (their own as well as others') and to sort values from facts, insofar as that is possible.

It may be objected that it is naive to suggest a rational procedure for planning under the Research and Marketing Act because of the unplanned and irrational character of the Act itself and of the forces behind it. If planning is to make sense, it may be argued, it must be powerful enough to deal with the central issues (the surplus problem), not merely those at the periphery of interest. If the Act is no more than an incident, a by-product of politics, if it is merely an obstruction thrown in the way of the power-seekers by the power-holders (who know that they can neither front the surplus issue nor leave it alone), then surely the directive power must concern itself with the central political issue, the surplus problem.

But the "scientific" method may not be an appropriate or desirable approach to a political problem, it may be further objected.[7] The issue is a struggle over power. The reasonable way may therefore be quite inappropriate. Indeed it may succeed only in preventing a resolution of the power struggle and the attainment of an equilibrium of power in which rational activity could proceed in a routinized way.

Without attempting again the task of taking the politics out of politics, it may be pointed out that planning may serve a useful purpose by changing the terms of the power struggle. A development plan (in city planning the term is "master" plan), for example, may project a desirable pattern of growth far into the future. It is against this pattern, which has been approved by the public

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[74] Paul H. Appleby, a former Under-Secretary of Agriculture writes, "Government must be big enough and powerful enough to be definitely superior to any and all special-interest groups. By the same token, governmental power should be exercised only by government-minded persons, by persons sensitive to the public interest and to public opinion and publicly responsible for their official acts." Readers of this article may not agree with Mr. Appleby's next sentence: "It is so exercised in the United States government today." *Big Democracy*, New York: 1945, p. 38.

[75] See H. J. Morgenthau, *Scientific Man and Power Politics*, University of Chicago Press; 1946.

and cannot be capriciously changed, that important proposals must be judged. The development plan, then, casts a beam of light far into the future where it illuminates the alternatives, the real ones and the spurious ones. The surplus problem can then be seen in its real nature in relation to the measures that will be taken for its solution, measures which may be *a*, *b*, or *c* (all of which are congruent with reality) as the play of power politics may determine. But, if, as an incident in the power struggle measures *d* and *e* are proposed, it will be seen in the light of the development plan that these are not congruent with the reality, that they are indeed obstructions. Thus politics will have become a somewhat more elaborate and difficult game, since it will have to take reason into account as never before, "How is it possible," Mannheim asked, "for man to continue to think and live in a time when the problems of ideology and utopia are being radically raised and thought through in all their implications?"[76] Alongside of this a parallel question may be phrased: in a time when a development plan exists, how will it be possible to live as if no plan existed?

[76] *Op. cit.* p. 38 and especially 169.

ADAPTATION OF THE FARM CAPITAL STRUCTURE TO UNCERTAINTY*

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Bureau of Agricultural Economics

ONE major area of interest in economic uncertainty is its conditioning influence on the structure and operations of the firm. Both general observation and an extensive literature on the theory of uncertainty suggest the operation of a number of such conditioning influences. But empirical verification so far has made little progress. This paper is concerned with the rather limited objective of presenting a few data bearing on apparent adaptations of the capital structure of agriculture to two different kinds of uncertainty situations.

As terminology in this field is far from standardized, the meaning attached to certain terms used here needs to be clarified at the outset.[1] The term "capital structure" is used in a broad sense to include the entire group of financial arrangements through which the firm achieves and retains control over resources used in its operations. Capital-structure adaptations thus include those relating to leasing arrangements as well as to the usual types of equity and credit financing. In this connection, the "farm firm" is treated as an impersonal entity conceptually separate from those persons who may participate in its operation and financing—operators, landlords, and creditors. This is much the same concept as that often used in accounting theory to define "the business." Such a concept is necessary if the capital structures of farms with different tenure and other financial characteristics are to be placed on a comparable basis for further analysis.

As capital structure adaptation is only one of several possible kinds of adaptations to uncertainty, it would not be surprising to find agricultural situations in which the degree of uncertainty confronting the firm differs greatly but in which capital structures show little difference. Adaptation might take other forms, such as

* This represents a revision of a paper prepared for informal discussion at a research conference on problems in economic uncertainty at the University of Chicago in June 1948.

[1] No claim is made for the superiority of these concepts and definitions for all analytical purposes. They are used in this paper in part because of the nature of the data available for study.

adjustment in the size of farm business or greater diversification of farm enterprises. But the adaptations of capital structure that do take place would be expected to be consistent in general with the *economics of the firm.* In general, capital-structure patterns would be expected to reflect a tendency for the cost of uncertainty bearing to the firm to be reduced to a minimum in view of the requirements of continued efficient operation of the firm as a whole. Put in another way, the capital structure would be expected to adjust to uncertainty in such a way that arrangements for uncertainty bearing in the capital structure would tend to become adapted both to the circumstances causing the uncertainty and to the relative efficiencies of different types of capital suppliers in performing the uncertainty-bearing function.

Data are not available to test for all, or even for a large number, of the possible causal relationships of uncertainty to farm-capital structure. Only two kinds of situations are considered in this paper: (1) Wide differences in uncertainty for the firm that stem from variability of crop yields caused mainly by natural hazards; and (2) wide differences in uncertainty for the firm that stem mainly from variations in the importance of day-to-day management in its financial success. High uncertainty of the first type is analogous, in the nonfarm field, to that found in speculative mining and oil-drilling ventures. High uncertainty of the second type is likely to be found among such nonfarm enterprises as specialized retailing in which careful attention to day-to-day details makes the difference between success and failure.

Development of data relating to these two types of uncertainty situations permits additional analysis that cannot be made on the basis of data relating only to uncertainty of one particular type. As already mentioned, one would expect in general that capital structure adaptations to high uncertainty would distribute the uncertainty bearing function in such a way as to minimize the cost of performing this function. But the particular form that the adaptation takes would be expected to vary with the relative efficiency of different groups in performing this function. This in turn may reflect the varying circumstances which give rise to the uncertainty. Cross comparisons of the patterns of adaptation found in the case of the two types of uncertainty situations can be made on the basis of specific items relating to the capital structure patterns of farms.

For purposes of this study, variations in the first type of uncer-

tainty are illustrated with data for 24 Great Plains wheat counties which have widely different records of wheat acreage abandonment. Variations in the second type of uncertainty are illustrated with data for 27 counties in the North Central States in which the proportion of total production represented by dairy products varies widely. In this 27-county sample, it is assumed that the importance of day-to-day management varies roughly with the proportion of total production represented by dairy products. The rationale of the decision to use data for these two groups of counties is discussed further in a later section.

Specific data used in this paper are in part a byproduct of another research project which has studied mainly broad relationships between the financial organization of farms and their characteristics as capital-using entities.[2] In that study each of the 108 counties is used as a separate observation. Estimates are made for each county for 1940 to describe: (1) The size and asset structure of farms; (2) the nature and composition of the gross product; and (3) the capital-structure patterns as measured by estimates of amounts and kinds of interests in the assets. Without going into detail, the main point for this paper is that the data from that study are *estimates for* entire counties for 1940. On no other basis is it possible at present to develop a body of comprehensive data that show enough about capital-structure patterns of farms to warrant analysis.

Adaptation of Capital Structure to Uncertainty Arising from Variation in Yields

Because yield uncertainty varies so widely among counties in the Great Plains, selected counties in that region are used to provide a

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[2] A cooperative research project of the Bureau of Agricultural Economics and the National Bureau of Economic Research, Inc. The research report is in the review-draft stage at the time this is written.

The use made of these data in the major research project involved a search for more basic general relationships of capital structure to economic characteristics of the agriculture than those which are only regional in scope. As uncertainty apparently reflects itself in a variety of ways in different kinds of agriculture, no attempt was made in that study to treat uncertainty separately. Instead, discussion of the separate influence of different kinds and degrees of uncertainty was confined to footnotes and appendixes—as possible explanations of the failure of the data to yield entirely consistent relationships of capital structure to asset size, asset structure, and product composition. The illustrations presented here represent an attempt to develop further a part of this footnote and appendix material, with the over-all results of the other project serving as a general framework of reference.

basis for comparisons of farm-capital structures. Available data are not entirely satisfactory for this purpose because estimates must be improvised from fragmentary capital-structure data pieced together from many sources, including special surveys. Accordingly, the analysis is handicapped at the outset not only by the roughness of some of the data but also by having to use a limited number of widely separated counties with only one thing in common—a large proportion of the product throw-off in the form of wheat.[3] The location of these counties is shown in figure 1.

The question that immediately arises relates to a statistically feasible method to distinguish among the 24 selected counties as regards probable degree of yield uncertainty. Crop-insurance rates, for example, reflect the judgment of the Federal Crop Insurance Corporation with respect to the rates that should be charged to differentiate among farmers in regard to their proper share of the cost of the insurance pool. But because of certain technical problems in using these data on a county basis, a rather simple statistical device was tried and found to agree fairly well with a number of other general indicators of yield variability. This device is the annual average percentage of wheat acreage abandoned for the years 1926–42. Differences in the percentages are so great that this device appears to differentiate well enough among the 24 counties to warrant the conclusion that the 8 high counties as a group contain agriculture which involve substantially more yield uncertainty than do the 8 low counties.[4]

One difference in the three groups of counties is found in the extent of asset deflation in the 1930's. Comparative data are shown below:[5]

	Group I	Group II	Group III
Percentage of wheat acreage abandoned, 1926–42	34	19	8
Percentage change in value of physical assets, 1930–40	−46	−46	−33

[3] These 24 counties include all wheat counties for which usable data are available on the several capital-structure items.

[4] The use of this device involves the assumption that yield uncertainty is likely to vary with extent of crop abandonment.

[5] In these and all other computations each county is given equal weight in the averages.

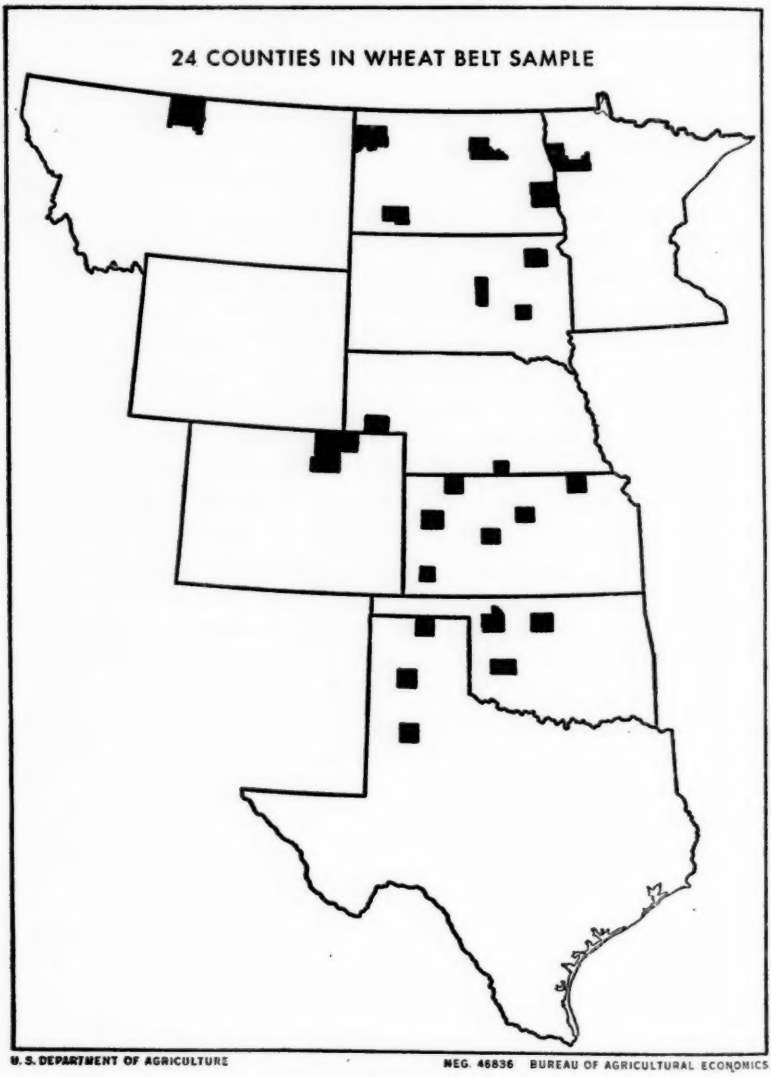

FIG. 1

Whether asset value levels were better adjusted in 1930 to long-run yield uncertainty than they were in 1940 is an interesting question on which to speculate. Had asset values declined during the 1930's by about the same percentage for all three groups, it might have

been argued that an allowance had already been made for differences in yield uncertainty in the 1930 values.[6]

But aside from the question of the extent to which the market discounts differences in yield uncertainty in putting values on agricultural assets, the fact that asset deflation was substantially greater in Groups I and II than in Group III complicates direct comparison of the capital-structure patterns of the three groups of counties in 1940. The mere fact that asset values fell 46 percent in two groups and only 33 percent in the third affects the comparability of the 1940 debt and equity items in the capital structures of the three groups of counties. Evidence based on an analysis of the entire 108-county sample, for example, indicates a fairly clear direct relationship between asset deflation in the 1930's and creditor interest in assets in 1940, particularly in the ratio of mortgage debt to the value of mortgaged farms. Operator interests in total assets in 1940, on the other hand, were inversely related to asset deflation in the 1930's. A simple stratification device is used, therefore, to hold average asset deflation relatively constant for the three groups of counties while still classifying the counties into groups by the extent of abandonment of wheat acreage.[7] This regrouping of counties produces three groups of 8 counties each that still differ sharply in the *average* percentage of wheat acreage abandoned but that are comparable as regards *average* asset deflation in the 1930's. The results of the stratification procedure are shown below:

	Group I	Group II	Group III
Average percentage of wheat acreage abandoned, 1926–42	31	19	11
Percentage change in value of physical assets, 1930–40	−42	−42	−42

[6] The lack of a difference in asset deflation between Groups I and II lends some support to this view. It may be that the smaller asset deflation in group III reflects in part a less disorganized real estate market in that group in the late 1930's. In this connection it is of some interest that from 1940 to 1945 real estate values alone rose 74 percent in group I, as compared with 55 percent in group II and only 29 percent in group III. It is possible, however, that assets in groups I and II were valued at a relatively too high level in both 1930 and 1945.

[7] The 24 counties were first arrayed from greatest to least asset deflation in the 1930's. The array was then divided into groups of three, which were then arrayed

For the comparison of capital-structure patterns to be most meaningful, it is desirable also to have the average size and basic business structure of farm firms reasonably comparable by groups. The following indices have been computed to determine to what extent such comparability results from the grouping of counties after stratification by asset deflation in the 1930's.

Indices of asset and product characteristics of farms in 1940	Group I	Group II	Group III
Asset Characteristics			
Average physical assets per farm	$12,070	$12,131	$11,371
Percentage of total physical assets represented by:			
Land	67	61	57
Buildings	12	14	17
Non-real-estate assets	21	25	26
Percentage of total acreage in cropland	59	56	64
Value of farmers' dwellings in 1930 as a percentage of the value of farm real estate in 1930	7	9	10
Product Characteristics			
Percentage of total value of product represented by:			
Crop and livestock sales	79	75	71
Dairy product sales	8	9	10
Poultry, poultry products, and other miscellaneous product sales	4	6	8
Farm products consumed by the farm household	9	10	11
Average number of days off-farm work per farm operator	37	22	19

Average asset size was somewhat larger in Groups I and II than in Group III. Furthermore, in Group I asset composition ran somewhat more heavily to land, and product composition ran somewhat more heavily to crops and livestock (mainly crops) than in the other two groups. But, on the whole, it seems safe to assume that differences among the three groups are not too great to invalidate general comparisons of capital-structure patterns.[8]

separately from high to low according to the average percentage of wheat acreage abandoned in the period 1926–42. The counties with the highest ratio in each of the 8 groups were then combined to form a new group I. Groups II and III were similarly constituted.

Because of the small sample, there is some doubt about the efficiency of any stratification procedure, but it would seem to regroup the 24 counties so that differences in asset deflation among groups of counties would not dominate the comparisons of capital-structure patterns to as great an extent as in the unstratified sample.

[8] Where appropriate, these differences can be taken account of in the comparisons on the basis of general relationships of asset and product characteristics of agriculture to capital structure found in the study of the entire 108 counties.

Comparisons of the capital-structure patterns of the three groups of counties are limited by available data. The broadest basis of comparison that seems feasible relates to the percentage distribution of interests in physical assets among operators, landlords, and creditors. These estimates are shown below:

Interest in physical assets (percent)	Group I	Group II	Group III
Operators	30	37	38
Landlords	35	35	33
Creditors	35	28	29

The operator interest was lowest in Group I. But from relationships found in the entire 108-county sample, it is not inconsistent to find somewhat lower operator interests in the agriculture with the higher-than-average physical assets per farm, the higher-than-average percentage of assets in land, and the higher-than-average proportion of value of product from crop and livestock sales. The lower operator interest may be accounted for in part, also, by the temporary holding of land by former creditors and by temporarily higher debts carried over from the 1930's. Accordingly, too much weight should not be placed on the fact that operator interests were relatively low in Group I.

But these data give no support to the view that high yield uncertainty forces farm operators to furnish a higher-than-average proportion of the capital invested in agriculture subject to such uncertainty. Greater uncertainty stemming from yield variability apparently does not make it necessary for farm operators to assume greater financial responsibility by owning a larger part of the assets used in such farms. On the other hand, the mere fact that the landlord interest runs as high as it does in Group I suggests that area-wide yield uncertainty does not necessarily repel landlord investment.[9] Such agriculture may attract considerable equity capital on a speculative basis for somewhat the same reasons that mining ventures often are able to attract speculative equity capital.

From the viewpoint of the distribution of the uncertainty-bearing

[9] 1940 is too close to the depression years to be most useful for this comparison. In view of this fact, it is of interest that some evidence supporting this observation is found by Mr. E. Lloyd Barber of BAE when data for individual Kansas farms for more recent years are grouped by yield variability classes.

function among investor groups, more information than is now available is needed on the sharing of this function between landlords and operators in the case of tenant-operated farms. Some evidence indicating that landlord investment in the counties with high yield uncertainty was somewhat more in the nature of speculative common stock than was such investment in low yield uncertainty counties can be adduced from certain Census tenure statistics. Comparisons based on methods of rental in the three groups are shown below:

Method of rental	Percentage distribution of value of real estate in tenant-operated farms in 1940		
	Group I	Group II	Group III
	Percent	*Percent*	*Percent*
Cash	5.4	9.4	7.9
Cash-share	15.3	35.8	41.1
Share	75.1	51.3	47.8
All other	4.2	3.5	3.2
Total	100.0	100.0	100.0

The most striking point in this tabulation is the high proportion of the value of tenant-operated farms in Group I represented by farms under share lease (about 75 percent as compared with 48 percent in Group III). In 1945 the percentage in farms under share lease in Group I was 77 percent as compared with 52 percent in Group III, which suggests that 1940 was not an abnormal year in this respect.

Data on the relative importance of the part-owner type of farm-business organization in these groups of counties also are revealing. In 1940 about 44 percent of the total farm real estate value in Group I was in part-owner farms, whereas the percentage in part-owner farms in Group III was 35 percent. This also may be a form of adaptation of capital structure to yield uncertainty. The operator may attempt to minimize his own fixed charges by owning only a part of the land he operates and renting land from a nonoperating owner. This tenure arrangement tends to place the uncertainty bearing associated with land ownership upon those who may have greater ability to bear it, thus increasing the efficiency with which this function is performed.

We turn next to the creditor interest in more detail. Selected

data bearing on the real estate credit picture in the three groups of counties are shown below:

Mortgage credit indices in 1940	Group I	Group II	Group III
Percentage of farms under mortgage	58	48	51
Percentage that mortgage debt is of the value of mortgaged farms	49	45	52
Percentage that mortgage debt is of the value of all farm real estate	23	21	24
Percentage of total farm-mortgage debt held by:			
Federal land banks and Federal Farm Mortgage Corporation	72	55	49
Insurance and mortgage-investment companies	5	15	20
Commercial and savings banks	3	4	3
Individuals and miscellaneous lenders	20	26	28

A higher than average percentage of the farms in Group I had mortgage debts but the debt-to-value ratio in Group I was no higher than that for the entire group.[10] The land banks and FFMC held a high proportion of the real estate loans in that group. This may reflect in part the overhang of the refinancing activities of the 1930's, but it seems probable that some difference might be found also in other periods. Insurance companies apparently did not lend heavily in Group I despite the fact that for the entire sample of 108 counties, agriculture with asset and product characteristics like those of Group I shows heavy participation by insurance companies. It seems reasonable to conclude that the greater yield uncertainty in Group I was an important factor influencing these lenders' loan policies. Banks were an unimportant source of real estate credit in all three groups, and private individuals' loans were a lower percentage of total real estate debt in Group I than in Group III.

Agriculture such as that in Group I may attract considerable equity investment by nonoperating individuals, even though it may not attract mortgage loans by such individuals to so great an extent as does that in Group III. It is possible that the mortgage

[10] An hypothesis for further investigation suggested by these data is that high yield uncertainty results in high debt frequency relative to the ratio of debt to value on mortgaged farms. The number of farms under mortgage may reflect mainly the demand for real estate credit, whereas the ratio of debt to value of mortgaged farms may reflect more the supply factor—the willingness of lenders to extend credit. However, the evidence is not clear enough from these data to warrant any definite conclusions on this point.

contract does not provide enough added security to cause investment to follow the debt-financing path in preference to the path of outright equity investment. In agriculture that is subject to great yield uncertainty, the inability of the borrower to live up to the terms of the usual mortgage contract in prolonged periods of low yields may impose disadvantages on lenders not unlike those of equity investors, without giving them the off-setting advantages of participating in the large returns from unusually large yields.

The 1940 figures on mortgage debt doubtless are influenced by developments in the 1930's. But the fact that all private lender groups were less important in Group I than in Group III suggests that the private mortgage contract as such is not very well adapted to shift uncertainty bearing to equity investors in that group of counties. It is possible that agriculture can involve so much uncertainty (or so much of a particular kind of uncertainty) that speculative equity investment by outsiders actually is better adapted to its financing than is conventional private mortgage financing. The mortgage contract may be well adapted to the shifting of uncertainty bearing from capital suppliers to other shoulders only within a certain range of uncertainty or only in connection with particular types of uncertainty situations.

Whereas real estate loans in Group I were about the same percentage of real estate assets as in Group III, the non-real-estate loans of the four lender groups for which data are available were much higher in 1940 in relation to non-real-estate assets in Group I than in Group III (44 as compared with 23 percent). Comparative data are shown below:

	Group I	Group II	Group III
Percentage that non-real-estate loans of principal lending institutions are of non-real-estate assets:	44	27	23
Banks and production credit associations	17	14	12
FSA and emergency crop and feed loans	27	13	11

Non-real-estate loans of both types of lenders were high in relation to non-real-estate assets in Group I. Possibly fluctuating yields tend to result in more carry-over loans on the average with the result that some of the capital that should be regarded as long-term investment is furnished, nominally at least, on a short-term basis. At least, a good *a priori* case can be made for the proposition that

in agriculture subject to great yield variability a substantial part of the annual production and living expense should be regarded as potentially long-term investment.[11]

Although data for any specific date are likely to reflect short-run influence as well as those of a longer run nature, the data for 1940 presented above still may reveal some of the basic relationships of the capital structure of the farm firm to uncertainty that stems from yield variability. No evidence is found to suggest that capital-structure adaptation to high yield uncertainty takes the form of requiring the operator to furnish a larger-than-average proportion of the capital. Nor is there any support for the proposition that nonoperating owners tend to avoid such agriculture. Particular creditors, such as insurance companies, avoid such agriculture, but depression-induced lending beclouds the picture too much to permit any sweeping generalization about the attitude of creditors in general toward such agriculture.

There appears to be a tendency, at least, for agriculture that is subject to high yield uncertainty to develop a capital structure that draws capital from sources peculiarly adapted to bearing the uncertainty that is inherent in such agriculture. In this sense, there is some support for the hypotheses that capital-structure adaptations tend to get the uncertainty-bearing function performed on a relatively efficient basis. Data such as have been presented here, however, throw very little light on such questions as whether agriculture subject to high yield uncertainty tends to be unduly handicapped in obtaining adequate capital from all sources combined. It would seem hazardous to reach any conclusion on this point on the basis of the reaction of particular sectors of the capital market to this kind of agriculture. Hesitation to lend on the part of particular creditor groups may be offset by the willingness of equity investors to finance such agriculture on a basis which gives them an opportunity to share in the profits of the years of high returns.

Adaptation of Capital Structure to Uncertainty Associated with the Crucial Importance of Management

In the previous illustration, the differences in uncertainty for the firm under consideration were those assumed to be associated

[11] This point is clearer if the firm maintained large financial reserves to tide over bad years. In bad years a substantial part of this fund would be invested in production and living expenses and in good years more of it would be in liquid reserves. The fund, as such, would be a part of the permanent capital of the business.

mainly with differences in yield variability. In this second illustration, the differences in uncertainty under consideration are those assumed to be associated with differences in the internal characteristics of farm firms that influence the significance of day-to-day management in financial success.

It is true that the human element involved in management is a factor of uncertainty confronting all types of farm firms. But some kinds of agriculture permit rather standardized procedures which can be carried out in routine fashion without much danger that unusually heavy losses will occur as a result of poorer-than-average management. The assets used are such that they are not harmed greatly by poor management, even though current income may be reduced thereby. Large-scale cash-grain farming would seem to rank toward the lower end of the scale measuring uncertainty that is associated with the crucial importance of day-to-day management. At the other end of the scale would be found agriculture in which day-to-day decisions make the difference between success and failure. It is probable that dairy, poultry, fruit and some kinds of specialty crop farming (perhaps tobacco) fall at the upper end of this scale. Success depends, it is true, on good land and other necessary resources, but to a very great extent the way in which the farm is operated spells financial success or failure. Farm firms engaged in this latter type of agriculture are considered here to involve a tendency to high uncertainty which stems from the crucial importance of day-to-day management in financial success.

As in the previous illustration, it is assumed here that uncertainty associated with the management factor varies with objectively measurable characteristics of the firm. It is assumed that farms engaged heavily in operations such as dairying and general farming would involve more uncertainty of this character than would farms engaged heavily in cash field crop production. From the standpoint of yield uncertainty, of course, the reverse might well be true, but here the emphasis is placed on uncertainty that stems from the internal nature of the business rather than from the operation of external forces.[12]

[12] Uncertainty stemming from the one influence does not exist in isolation from uncertainty stemming from other influences. The best that can be done at present in the construction of models for comparative purposes is to choose kinds of agriculture in which yield uncertainty is low but substantial differences are found in characteristics of the agriculture that presumably would give rise to varying uncertainty for the firm because of the management factor.

Three Selected Counties

Probable relationships of importance of management to capital structure may be illustrated with data for three individual counties. Green County, Wisconsin, is used to illustrate a kind of agriculture that is characterized by a tendency to high uncertainty for the firm because the kinds of assets used in farming and the concentration on dairy farming make financial success heavily dependent upon day-to-day management.[13] Garfield County, Oklahoma, is used to illustrate a cash field crop type of agriculture in which the day-to-day management factor presumably is less critical.[14] Delaware County, Iowa, is used to illustrate an intermediate type of agriculture. Indices showing general characteristics of the agriculture in these three counties are presented below:

Indices of asset and product characteristics of farms in 1940	Green County, Wisconsin	Delaware County, Iowa	Garfield County, Oklahoma
Asset Characteristics			
Average physical assets per farm	$14,584	$16,511	$15,244
Percentage of total physical assets represented by:			
Land	33	47	69
Buildings	33	28	11
Non-real-estate assets	34	29	20
Percentage of total acreage in cropland	49	65	66
Value of farmers' dwellings as a percentage of the value of farm real estate in 1930	18	14	8
Product Characteristics			
Percentage of total value of product represented by:			
Crop and livestock sales	36	62	80
Dairy product sales	50	21	8
Poultry, poultry products, and other miscellaneous product sales	5	8	5
Farm products consumed by the farm household	9	9	7
Average number of days off-farm work per farm operator	13	14	32
Average percentage change in physical assets, 1930–40	−26	−26	−21

[13] The point needs to be emphasized that in assuming that such agriculture has *a tendency* to high uncertainty it is not argued that mortality of firms is unusually high. A tendency to high uncertainty need not result in numerous business failures. Adaptations in capital structure and other features of farm organization may offset this tendency. Similarly, in the high-risk wheat counties it is conceivable that a type of business and financial organization better adapted to yield variability might reduce the mortality of farm firms to the average for the country. Still such

As these three counties are "picked" for particular characteristics rather than chosen at random, too much weight should not be given to the specific results.[15] They were selected not only because of wide differences in kind of agriculture but also because both average asset size per farm and asset deflation in the 1930's were approximately equal for all three counties. The average farm for each county thus is comparable as regards both asset size and financial experience in the 1930's. This facilitates comparisons of capital-structure items. Indices of variation in capital structure are shown below:

Indices of characteristics of financial organization of farms in 1940	Green County, Wisconsin	Delaware County, Iowa	Garfield County, Oklahoma
Distribution of interests in assets (percent)			
Operators	47	47	47
Landlords	26	33	36
Creditors	27	20	17
Percentage of farms under mortgage	51	45	44
Percentage mortgage debt of the value of mortgaged farms	62	52	30
Percentage mortgage debt of the value of all farm real estate	34	23	16
Percentage of total farm-mortgage debt held by:			
Federal land banks and Federal Farm Mortgage Corporation	26	26	31
Insurance and mortgage-investment companies	3	39	38
Commercial and savings banks	12	9	12
Individuals and miscellaneous leaders	59	26	19
Percentage non-real-estate loans of principal lending institutions of non-real-estate assets:	7	6	13
Banks and production credit associations	6	5	11
FSA and emergency crop and feed loans	1	1	2

The fact that operator interests were 47 percent of total assets in all three counties may or may not be significant. Still, this agrees

agriculture might be said to involve high uncertainty on the assumption of no adaptation to this factor.

[14] This county is one of the 24 counties previously discussed. It had an average abandonment percentage of only 4.3 percent of wheat acreage for the period 1926–42. Accordingly, it cannot be said to be greatly influenced by uncertainty that stems from yield variability.

[15] It should be noted also that the margin of error in the data for individual counties is likely to be larger than for groups of counties, because data for broader areas are used to approximate some of the figures.

with findings in the analysis of the larger 108-county sample which indicate that operator interests tend to vary inversely with asset size of farm. It suggests that the proportion of total assets represented by outside interests (landlords and creditors) may be related more to asset size than to nature of the agriculture.

Although each of the three counties obtained 53 percent of total capital from "outsiders"—(from landlords and creditors),—in Green County, Wisconsin, the landlord and creditor interests were approximately equal, whereas in Garfield County, Oklahoma, 36 percent was landlord interest and only 17 percent creditor interest. These relationships suggest that the loan-contract device may be used more to channel outside capital into agriculture in the dairy county. By this means, uncertainty bearing may be placed more heavily on the operator, who, in turn, presumably is able to influence financial results by day-to-day management policies.[16] Outside capital may flow to agriculture in the cash field crop county to a greater extent in the form of outright equity investment by nonoperators, in part because uncertainty there is due more to external forces such as price and yield variations over which neither the operator nor the landlord has much control.

A sharp difference is found between the dairy and the cash-crop county in the ratio of real estate debt to real estate assets—34 as contrasted with 16 percent. Furthermore, nonoperators appear to have invested heavily in the dairy county by lending on mortgages, whereas in the cash field crop county they tended to own the real estate outright. The mortgage contract apparently toned down the uncertainty for individual investors in the dairy county by placing more of the uncertainty bearing on the owner's shoulders. In the cash-crop county outright investors might be in almost as good a position to deal with ownership risks as the operator. Insurance companies, however, avoided the dairy county but loaned heavily in the cash field crop county. Lending risks which are characteristic of the dairy county apparently could be toned down enough by a mortgage contract to attract loans by local individuals, but could not be toned down enough by this means to attract lenders such as insurance companies.

Differences in the asset structure of farms among the three coun-

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[16] Those operators who cannot carry the added financial responsibility presumably either are unable to obtain loans or are weeded out as business failures.

ties also may help to explain the differences in capital structures. Where assets consist so largely of buildings and non-real-estate assets, as in Green County, it seems reasonable to expect that day-to-day protection of these assets is very important in their maintenance. The assets of the dairy county could deteriorate very rapidly, with heavy losses for the firm, if not protected by having the financial responsibility rest heavily on the operator's shoulders. Assets in Garfield County, on the other hand, might withstand more neglect, because such a large part of the total consists of cropland and so small a part consists of buildings and livestock.

The tendency for farm firms to control land by the device of the operator renting in land is more pronounced in Garfield County, Oklahoma. In that county 36 percent of the value of all farm real estate was in part-owner farms as compared with 9 percent in Delaware County, Iowa, and 4 percent in Green County, Wisconsin. Farm land probably could be owned in counties such as Garfield by nonoperators as an impersonal investment to be rented to active farmers, whereas in Green County the kind of farming might require that all land used in a farm be an integral part of one business unit. The operator in Green County, therefore, might use mortgage credit to control the necessary resources, whereas in Garfield a rental contract would suffice.

Data on the relative importance of different kinds of rental contracts are shown below:

Method of rental	Percentage of distribution of value of real estate in tenant-operated farms in 1940		
	Green County, Wisconsin	Delaware County, Iowa	Garfield County, Oklahoma
Cash	15.0	26.3	7.3
Cash-share	1.1	19.6	50.0
Share	81.4	51.3	39.1
All other	2.5	2.8	3.6
Total	100.0	100.0	100.0

These data are in contrast to those tabulated for the three groups of wheat counties. Here the county in which uncertainty associated with the crucial importance of management presumably is highest is found to have the highest percentage of tenant-operated land under share rent. Thus there does not appear to be any tendency,

as revealed by these data, for the terms of rental contracts to place heavier financial responsibility on the operator in counties like Green County. Further details on rental agreements, however, might well modify the picture presented by these generalized data.

The foregoing data relating to these three counties do not provide either the detail or the degree of precision required to demon-

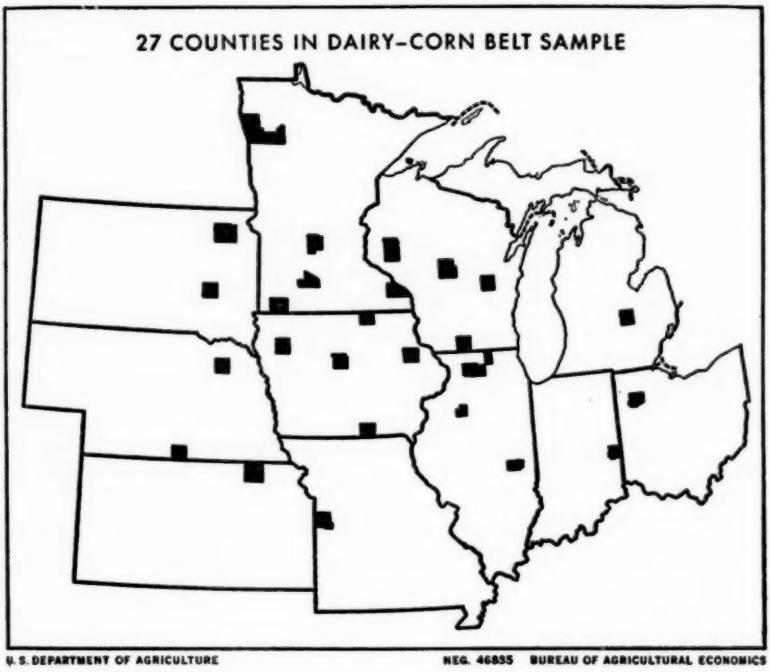

FIG. 2

strate conclusively that farm firms which tend to be confronted with a high degree of uncertainty because of the crucial importance of day-to-day management tend to have capital structures adapted to dealing with this kind of uncertainty. Still, the capital structure as a whole in Green County appears to distribute the capital supply and uncertainty-bearing functions among operators, landlords, and creditors (and among different types of creditors) in a way that tends to associate the functions of uncertainty bearing with the group that is in a better position to deal with its causes. A part of the explanation of differences in tenure and credit arrangements,

when viewed as aspects of the capital structure of farm firms, may thus be found in differences in uncertainty associated with the crucial importance of day-to-day management in financial success.

Three Groups of Counties

Data for groups of counties are difficult to place on a sufficiently comparable basis to permit the same kinds of comparisons that can be made on the basis of the three "picked" counties. In fact, differences in type of farming introduce differences in basic business structure. For these further comparisons, the 27 counties shown in figure 2 are used. To keep the three 9-county groups comparable as regards financial experience in the 1930's, the sample is stratified by asset deflation in the 1930's in the manner described earlier for the 24 wheat counties. After stratification, the *average* percentage reduction of assets during the 1930's was approximately 30 percent for each group. But the three groups are still not comparable on average assets per farm. Data on asset and product characteristics of the three groups of counties are shown below:

Indices of asset and product characteristics of farms in 1940	9 high dairy product counties	9 middle dairy product counties	9 low dairy product counties
Asset Characteristics			
Average physical assets per farm	$10,493	$13,508	$15,328
Percentage of total physical assets represented by:			
Land	41	47	57
Buildings	30	27	19
Non-real-estate assets	29	26	24
Percentage of total acreage in cropland	56	65	66
Value of farmers' dwellings in 1930 as a percentage of the value of farm real estate in 1930	16	15	10
Product Characteristics			
Percentage of total value of product represented by:			
Crop and livestock sales	46	65	76
Dairy product sales	34	16	8
Poultry, poultry products and other miscellaneous product sales	8	8	7
Farm products consumed by the farm household	12	11	9
Average number of days off-farm work per farm operator	21	21	17
Average percentage change in physical assets, 1930–40	−32	−29	−32

In the high-dairy product group (dairy product sales 34 percent of total value of product) average assets per farm are about $10,500, as compared with about $15,300 in the low-dairy product group (dairy product sales about 8 percent of total value of product).[17] Accordingly, comparisons of capital-structure items must be made with due allowance for possible independent influences stemming from difference in average asset size of farms among the three groups of 9 counties each. One such effect of the difference in asset size is suggested by the difference in the operator interest in total assets—49 percent for the high-dairy product group as compared with 39 percent for the low-dairy product group shown in the following tabulation:

Indices of financial organization of farms in 1940	9 high dairy product counties	9 middle dairy product counties	9 low dairy product counties
Distribution of interests in assets (percent)			
Operators	49	47	39
Landlords	26	28	36
Creditors	25	25	25
Percentage of farms under mortgage	52	50	47
Percentage mortgage debt is of the value of mortgaged farms	52	47	48
Percentage mortgage debt is of the value of all farm real estate	27	24	22
Percentage of total farm-mortgage debt held by:			
Federal land banks and Federal Farm Mortgage Corporation	37	44	40
Insurance and mortgage-investment companies	15	24	31
Commercial and savings banks	9	8	6
Individuals and miscellaneous lenders	39	24	23
Percentage non-real-estate loans of principal lending institutions are of non-real-estate assets:	12	15	19
Banks and production credit associations	9	11	15
FSA and emergency crop and feed loans	3	4	4

The interest of real estate creditors in the real estate was 27 percent in the high dairy product group as compared with 22 percent in the low-dairy product group. This is balanced by a re-

[17] A significant part of the adaptation to high uncertainty may take the form of a tendency to smaller farm businesses.

verse relationship for non-real-estate creditors' interests in non-real-estate assets, so that the creditor interest in total assets remains at about 25 percent for all three groups. With asset size more nearly equal for all three groups, the distribution among operator, landlord, and creditor interests probably would conform more nearly to that found for the three individual counties.

As in the three county comparison, individuals were a more important source of real estate loans in the high- than in the low-dairy product group. They held 39 percent of the mortgage debt in the former as compared with 23 percent in the latter. Also, insurance companies held the lower percentage of total mortgage loans in the high dairy product counties.[18]

If allowance is made for difference in asset size, it appears that three groups of counties reveal much the same kinds of differences in capital structure that were found in the case of the three picked counties. The capital structure in the group with a high proportion of product from dairy sales appears to be such that uncertainty bearing is placed to a greater extent on the operator. But only small differences are found among the three groups of counties with respect to the importance of the part-owner type of farm business organization. In the high-dairy product group the value of such farms was 15.5 percent of the value of all farm real estate as compared with 18.5 percent in the low-dairy product group. Moreover, as in the three county comparisons, generalized data on method of rental do not indicate any clear-cut differences reflecting a tendency for rental contracts to shift more of the uncertainty bearing to the operator in the high-dairy product group.

The foregoing data for the three individual counties and for the three groups of counties are useful mainly to illustrate possible adaptation of capital structure to the uncertainty facing the farm firm that stems more from the nature of the assets and operations

[18] If insurance companies loaned heavily on the high-dairy product counties, it would be easier to explain the capital structure in these counties in terms of greater stability of income. It could be argued that stability of income not only encourages operators to buy farms on borrowed money but also enables them to accumulate more savings, thus making it unnecessary to rent land to such an extent as in the low dairy product counties. But the fact that neither landlord nor insurance company investment is of much importance in the high-dairy product counties suggests the presence of a kind of uncertainty that is less prominent in cash-grain farming. Local lenders, who are in a position to maintain contacts with their investment may be able to deal with this kind of uncertainty as it affects their investments, whereas large centralized lenders may be able to deal better with moderate uncertainty arising mainly from price and yield variations.

of the firm than from external forces such as weather and prices. One reason why this kind of uncertainty attracts less attention than that associated with yield or price variations probably lies in the tendency for capital structure and other forms of adaptation to be more complete than in the other case. When adaptation is fairly complete the agriculture of an entire area may be generally regarded as "low-risk" agriculture. Still, it is only by recognizing the the underlying tendencies to uncertainty that it is possible to understand why the capital structure of such agriculture shapes up as it does.

The reality of the concept of uncertainty associated with the crucial importance of management in financial success might be much more readily recognized under something approaching experimental conditions—for example, if efforts were made to introduce dairy and general farming into areas characterized by farm-capital structures already adapted to cash crop farming. Advantages of stabilizing income by diversification have often been urged as an argument for such changes in farm organization. But it seems probable that such a change would also introduce other elements of uncertainty inherent in the nature of the farming operations and the kinds of assets involved which might require also considerable adaptation of the capital structure. More of the uncertainty-bearing function might have to be placed on those who are in a position to protect the firm against the kinds of losses that result from inadequate day-to-day management.

General Observations

The data presented in this paper may be interpreted from at least three partially independent viewpoints: (1) Their possible bearing on economic theory, with special reference to the role of economic uncertainty in the economic process; (2) questions of methodology raised by the use of county aggregates and averages as a basis for the comparisons; and (3) implications for public policy in relation to agriculture. A few general observations are offered on these three points.

The data suggest a general tendency for the farm-capital structure to adapt to the degree of uncertainty confronting the farm firm. There is some evidence of a tendency for the firm to economize in regard to uncertainty bearing. The prominent part apparently played by landlords as bearers of uncertainty in agriculture

that is subject to high yield variability suggests one kind of adaptation of capital structure that may reduce the cost of uncertainty bearing to the firm. Uncertainty bearing appears to be done more largely by landlords, an investor group that presumably has greater-than-average ability to carry it. However, government also appears to have been a major contributor to uncertainty bearing, as is indicated by loans of federally sponsored credit agencies.

In the case of agriculture that is subject to high uncertainty because of the crucial importance of day-to-day management in financial success, economizing in the performance of the uncertainty-bearing functions appears to have taken the form of associating more of the uncertainty bearing with the investor group that provides the day-to-day management. The operating owner, who tends to bear more of the risk in such agriculture, may be able to hold down the total cost of uncertainty bearing by following management policies that actually reduce uncertainty. The greater importance of local lenders in such agriculture also points to an adaptation of capital structure that associates the residual uncertainty bearing of the creditor with types of investors that may be in a better than average position to reduce uncertainty through direct influence on managerial decisions.

There is no evidence in these data regarding the degree of efficiency in uncertainty bearing that is achieved through such farm-capital structure adaptations. Each of the two patterns of adaptation, however, appear to represent tendencies toward reduction in the cost of uncertainty bearing that conform reasonably well with the nature of the respective uncertainty situations. In most cases it would be expected that a combination of several economizing arrangements would be present. The data used here exaggerate differences in the nature of the uncertainty situation in order to cause any associated differences in capital-structure adaptations to stand out more sharply.

The comparisons also suggest a number of problems, even though they do not provide adequate answers. For example, they suggest that the full effects of uncertainty on capital supply for farms may not be evident from a study of credit supply alone. On the one hand, direct-equity investment by nonoperators may take the place of creditor investment in agriculture that is subject to high-yield uncertainty. Creditor investment may be repelled by deficiencies of the loan contract as a method of shifting uncertainty to other

shoulders. Still, the agriculture may attract nonoperator equity investment in large volume. On the other hand, the mere fact that agriculture that is subject to high uncertainty because of the management factor appears to be able to attract credit in large volume does not necessarily mean that total capital supply is adequate. Such agriculture may be restricted in regard to total capital supply by the limited amount of landlord investment. Nonoperating individuals may invest in mortgages on farms of owner operators in preference to outright farm ownership. Accordingly, data are needed on the supply situations for all kinds of investment in agriculture before we can fully appraise the extent and significance of "capital rationing" in different kinds of agriculture.

The limitations of county data such as are used here for econonomic analysis have often been noted. Still, such data have some positive advantages when the principal purpose is to explore general patterns of relationships. A substantial body of data that is not available for individual farms can be obtained on a county basis. Furthermore, the county is a large enough unit to permit estimates for items that would have too wide a margin of error if made for individual farms. But in achieving greater coverage of significant items by the use of county data, the chances are greater that important differences in the agriculture will be obscured. Accordingly, such data are more useful when variations by counties in the phenomena to be studied are pronounced, as in most of the phenomena chosen for study in this inquiry.

County data can be used advantageously when the objective of the inquiry is also to test for the presence of clusters of economic relationships that collectively suggest the nature of the economic processes at work. In this inquiry selected items relating to crop records, sources of income, types of assets used, tenure and ownership patterns, agricultural loans, and credit institutions have been used to sketch in important highlights of the phenomena to be studied. But because the meaning of these data depends heavily upon individual interpretation, results necessarily must be subject to divergent interpretations by different research workers. For this reason, the results based on such data must necessarily be extremely tentative pending further testing under different conditions and possibly different assumptions.

Although data presented here do not provide positive answers to questions of agricultural policy, they nevertheless help to point

up some of these questions. For example, does more widespread landlord investment in agriculture that is subject to high-yield variability offer enough in the way of increased efficiency in performing the uncertainty bearing function to require the reconsideration of long-established ideals regarding farm tenure? Are governmental loan programs capable of adaptation to the positive task of providing additional uncertainty-bearing facilities in so-called "high-risk" areas? Does the degree and kind of control appropriately associated with governmental loan programs depend in part upon the extent to which management policies can influence variations in, and levels of returns to, the farm business? Assuming that the degree of capital rationing operating in a particular sector of agriculture is considered too severe, is the loan process the most effective channel through which to induce an added flow of capital to the area? All such questions must draw a part of their answers from facts regarding the relationships of uncertainty in agriculture to the capital market from which agriculture is financed. A few of these relationships are revealed by data such as are included in this paper.

A NOTE ON BILATERAL MONOPOLY, WITH SPECIAL REFERENCE TO SEASONAL AGRICULTURAL LABOR

ALEXANDER J. MORIN

I

ANALYSIS of problems of exchange in terms of indifference curves can be used to demonstrate the price and quantity results of exchange in varying situations of competition and unilateral or bilateral monopoly.[1] Situations of the latter type—monopolistic sellers facing buyers in competition, or monopsonistic buyers purchasing from competitive sellers, or single sellers meeting single buyers in one market—are common throughout our economic system. One such situation is examined below—that of exchange between laborers and employing farmers in an industry utilizing seasonal agricultural labor.

Fig. 1 contains two indifference maps, exemplifying certain preference patterns in a particular industry. On the one hand, each point on the indifference curves convex to the origin o at the lower left-hand corner of the diagram ($l_0, l_1, l_2, \ldots$) represents some combination of income received in exchange for leisure given up, from the standpoint of the laborers. On the other hand, each point on the indifference curves convex to the origin o' at the upper right-hand corner of the diagram ($e_0, e_1, e_2, \ldots$) represents similarly some combination of work-hours received in exchange for wage-bill paid, from the standpoint of the employers. All points on any one of the indifference lines represent such combinations as are of equal "satisfaction" to the laborers or employers. The proportions of the "box" in the diagram are determined by the total supply of the items involved in exchange which is in the hands of the parties to the exchange. Thus the line oz in Fig. 1 represents the total amount of leisure which the laborers in this market can give up in

[1] The indifference curve technique was most recently used in the pages of this JOURNAL, to somewhat different purpose, in Southworth, Herman M., "The Economics of Public Measures to Subsidize Food Consumption," this JOURNAL, February, 1945, pp. 48–56. For a full exposition of the technique and its underlying assumptions see Hicks, J. R., *Value and Capital* (Oxford, 1939), Part I, and for a lucid and more detailed example of the particular form of this analysis used in this paper see Wassily Leontief, "The Pure Theory of the Guaranteed Annual Wage Contract," *Journal of Political Economy*, February, 1946, pp. 76–79.

exchange for income, and the horizontal line $o'z$ indicates the total amount of wage-bill which the employers can exchange for work-hours. Both are assumed limited by forces independent of the exchange herein examined, and both are measured in terms of some time period (i.e., work-hours per day, income per day, etc.).

It should be noted that in Fig. 1 the indifference maps represent

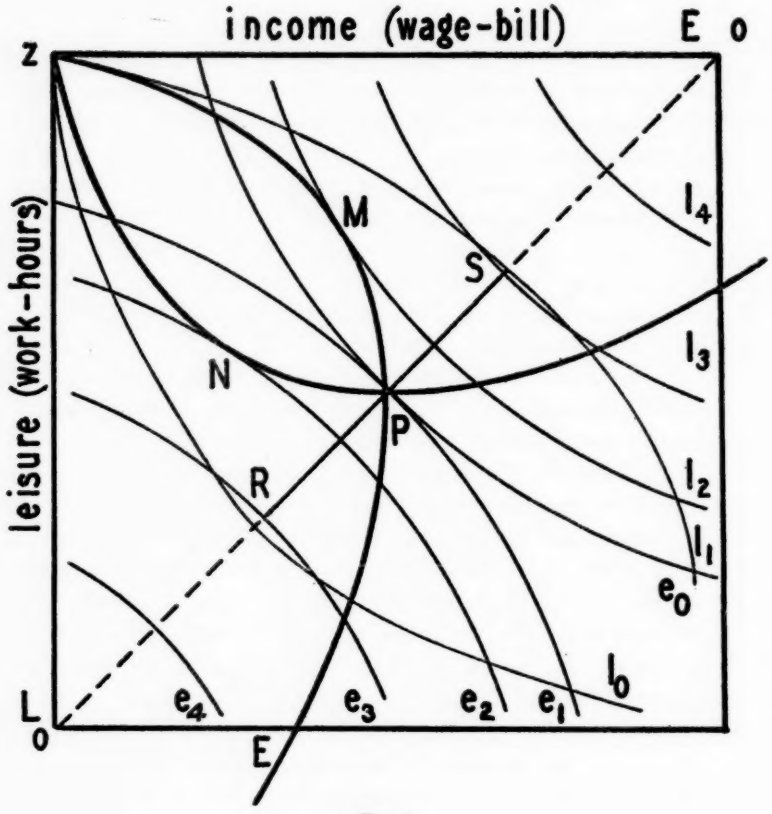

FIG. 1

the preference patterns of a particular industry rather than of particular individuals or firms. This result may be achieved theoretically by taking each map as "representative" of all members of the group in each case, in some sort of average concept. More realistically, it may be assumed that both labor and employers bargain through organizations, and that in this sense the maps represent

the consensus of the preferences of the individual laborers and farmers involved. It is further necessary to make an independence assumption regarding all exchanges other than the one involved here; i.e., labor must be assumed to have a given and finite amount of leisure (oz) which it can (or will) give up *only* in exchange for income derived from the specific employers involved, and the employers must be assumed to have a given and finite amount of money ($o'z$) which they can (or will) give up *only* as wages for hours of work derived from the specific laborers involved. But this study is of wage and employment determination for a single season, and within that period immobilities both in the labor and capital market are sufficiently great to render this restrictive assumption less onerous than it might appear on theoretical grounds.

In Fig. 1, assuming given indifference maps of labor and employers between leisure and income (or between work-hours and wage-bill from the employer standpoint), and with varying ratios of exchange, offer curves zNP and E may be derived for labor and employers respectively. In Fig. 3, for example, the lines r_1, r_2, r_3, . . . represent various exchange ratios between work-hours and wage-bill; the points of tangency of these lines with the employers' indifference curves represent the maximum "welfare" which employers can secure at each such exchange ratio. The line connecting these points (E_1 in Fig. 3, E in Fig. 1), the offer curve for employers, thus shows at varying exchange ratios the size of wage-bill employers will offer for a given number of work-hours; similarly the offer curve for labor shows the amount of leisure which labor will offer for a given amount of income, at varying exchange ratios. From these offer curves traditional Marshallian demand and supply curves for labor or for wage-bill may be derived directly for the industry in question.

Three solutions to the problem of the outcome of exchange between labor and employers are of interest here:

(1) It may be shown that in perfect competition equilibrium in exchange will be reached at the point of intersection of the two offer curves (P, in Fig. 1), where the marginal rates of substitution of leisure and income for labor and of work-hours and wage-bill for employers are equal.[2] At P indifference curves of the two par-

[2] For a discussion of the concept of the marginal rate of substitution see Hicks, *op. cit.*, Ch. 1.

ties must be tangent; this and all similar positions may be called "efficient," in the sense that they are positions from which it is impossible to move so as to improve the position of one party without worsening that of the other.[3] The point P is also one of a range of possible solutions under conditions of bilateral monopoly, examined further below.[4]

(2) If, with indifference maps as in Fig. 1, labor acts with monopoly power against employing farmers in competition, labor can maximize its "welfare" by setting the quantity of leisure it gives up at that point on the employers' offer curve touching its own highest possible indifference curve (i.e., at M). Correspondingly, if the employers as a monopsony buy work-hours in a free labor market they can maximize their "welfare" at point N on Fig. 1, where their highest possible indifference curve is tangent to labors' offer curve. From an allocative standpoint these are not "efficient" solutions, not lying on the curve connecting all points of tangency of indifference lines of the two preference maps; but no movement away from these points can take place which will benefit both groups involved.

Points M and N may also be solutions under conditions of bilateral monopoly if one or the other party completely dominates the bargaining between the two. In this sense they may be considered limiting cases, and along the line MPN there are a range of solutions corresponding to varying degrees of dominance or subordinance on the part of employer or labor groups. At point P neither party is dominant; any movement from P toward M implies increasing dominance of labor, and from P toward N increasing subordinance of labor. Location at any points other than P, M or N must theoretically be an unstable solution; realistically,

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[3] To the best of the writer's knowledge, the use of the term "efficient" to describe the welfare position defined in the text (above) originated with Prof. Wassily Leontief of Harvard University. It should be noted that it carries no implications of distributive justice; starting with any *given* distribution of income (or wealth, etc.), it merely states that adjustments may be made in that distribution without worsening either party's position up to the point of tangency of two of their indifference curves as in Fig. 1. No judgment may be made as to the relative advantages of two such points of tangency without introducing non-economic considerations as a guide.

[4] The subsequent discussion to an extent follows that developed by Dr. William Fellner, "Prices and Wages Under Bilateral Monopoly," *Quarterly Journal of Economics*, August, 1947, pp. 503 ff. Dr. Fellner's analysis is in terms of "correspondence curves," based on average cost and average value product schedules for individual firms in a bilateral monopoly relationship, and is therefore less general than the device used here.

this may often be the case in employer-union negotiations, with an unequal balance of power reached and made temporarily stable by collective bargaining agreement.

(3) Collective bargaining may be pursued on an "all-or-none" basis; unions may demand a wage-rate together with a minimum quantity of labor to be employed, and correspondingly employers may demand a rate together with a maximum wage-bill to be paid, with none to be paid at higher rates. A situation of bargaining of this type, in which labor as a monopoly sells work-hours to competitive employer buyers, is graphically illustrated in Fig. 1 at point S; in this case labor will offer a given quantity of work-hours at a price such that labor is located on its highest possible indifference curve, subject to the limitation that this point must be on, or or just better than, the employers' zero indifference curve. Along this latter line employers are indifferent as to whether or not they purchase any work-hours of labor at all. Correspondingly, an employer monopsony buying in a competitive labor market would locate at R, just above the zero indifference curve of labor. These are "efficient" solutions, inasmuch as any movement away from S or R will worsen the position of one or the other of the parties to the exchange; at S or R an indifference curve just above the zero indifference line of one group is tangent to the highest possible indifference curve of the other.

These points are again the limits of a range of possibilities in the case of bilateral monopoly, varying from complete labor dominance at S to complete employer dominance at R, and P is a special case within this range. The line SPR has limits set by the zero indifference curves of the two parties to the exchange, and all points along SPR equally are "efficient." Solution is indeterminate, with the location of the final result in any specific case and at any specific time depending on the degree of dominance or subordinance of one or the other party.

A question may properly be raised here as to the economic objectives of a trade union. In Fig. 1 and in the discussion following it is assumed that the significant exchange from the standpoint of labor is between leisure and income, and that on a group bargaining basis a labor union is concerned with maximizing total income (wage-bill) to its membership. Realistically, this may not be the case. Dr. Fellner,[5] for example, sets up an indifference map for a

[5] Fellner, *op. cit.*

trade-union between wage-rate and employment, and other alternative goals might fruitfully be considered. Actual collective bargaining situations may include considerations not only of these latter goals, but also may involve the winning of public opinion, the demonstration of power over the opposing party in order to weaken his future bargaining strength, the maintenance of unity within the union, and other elements in addition to pure considerations of the size of the wage-bill. Possibly "income" as plotted on the horizontal axes of Fig. 1 should be construed to refer to a composite, covering a common and properly weighted set of these goals at interest in the bargaining process. But such a notion involves too many complexities and goes too far afield from the principal topics of this paper to be further developed here.

II

The general analysis outlined above has proved particularly fruitful in connection with the investigation of one specific set of collective bargaining problems. In examining the organizing potential of agricultural laborers the special problem of the strength of bargaining position of workers in seasonal crops plays an important role. It is immediately apparent that this strength is subject to wide variation during the year; taking a particular example in the case of apple orchards, demand for labor at harvest time actually may be fifty times as great as during the remainder of the year. During the harvest this demand is inelastic at a high level of employment; this inelasticity is compelled by the great capital investment and high fixed costs involved in the orchard crop together with the perishable nature of that crop. During the off-season demand for labor is relatively elastic at a low level of employment; much of the necessary work is of a type which can be supplied by the farmer himself and members of his family, and generally is so supplied in high-wage periods.

It can be assumed for purposes of this analysis either that this demand is for a work-force of homogeneous composition, or that the union representing labor negotiates without regard to any heterogeneity in skill among its membership (or on the basis of an agreed-upon consensus with regard to such skills). Based on any given set of cost-price conditions, it must also be assumed that at some wage-level the demand curve for harvest labor becomes elastic and has a negative slope.

In Fig. 2 these curves are represented by D_1 for the harvest season and D_2 for the rest of the year. Behind them lie sets of indifference lines for employers, e_0, e_1, e_2, . . . for the harvest season on Fig. 3 and e_0', e_2', . . . for the rest of the year on Fig. 4 (the subscript numbering has ordinal significance only). The indifference map for the inelastic demand curve is such that as the wage-rate

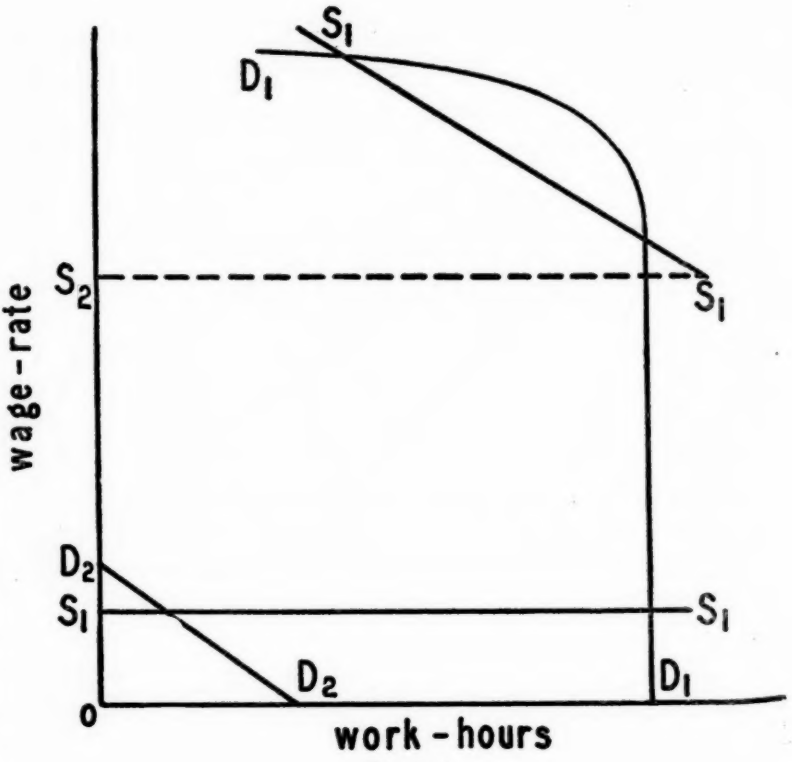

FIG. 2

rises the marginal rate of substitution of wage-payments for a given number of work-hours rises over a considerable range, in order that the number of work-hours demanded remains the same over the corresponding range of wage-rates. The offer curves upon which D_1 and D_2 are based are E_1 and E_2 in Figs. 3 and 4, with the former again reflecting in its straight line section the inelasticity of demand for labor up to very high wage rates.

Except for the war period, empirical observation of the labor market for seasonal farm workers shows it to be composed of a large group of low-income families, freely competing for a relatively limited number of jobs. This would indicate that the supply curve of such labor in its simplest form might be assumed to be perfectly elastic at a low wage rate; this implies a straight-line indif-

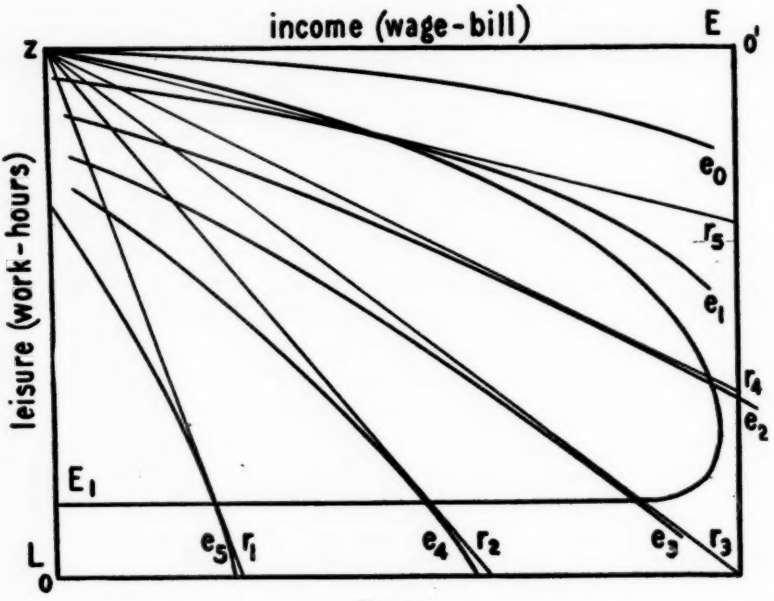

FIG. 3

ference curve and offer curve identical with any given rate of exchange between leisure and income from wages. But the war period, which for several reasons had the effect of giving the supply curve positive slope, also indicated that above a certain wage it began to develop a markedly negative slope. This was particularly true in the seasonal agricultural industries in question, where much of the labor force is normally composed of women and children; these latter groups leave the force in increasing numbers as their prosperity grows.[6]

[6] There are some empirical indications that at still higher wage levels, approaching those of competing urban occupations, the supply curve again rises upward and to the right.

In normal times, however, this area of negative slope has not been a significant factor. The disorganization of the labor market and the over-supply of seasonal farm labor available have made the elastic range of the supply curve the only section relevant in actual exchange. Accordingly the labor supply curve (S_1) is shown in Fig. 2 as of two discontinuous sections, one perfectly elastic at a low

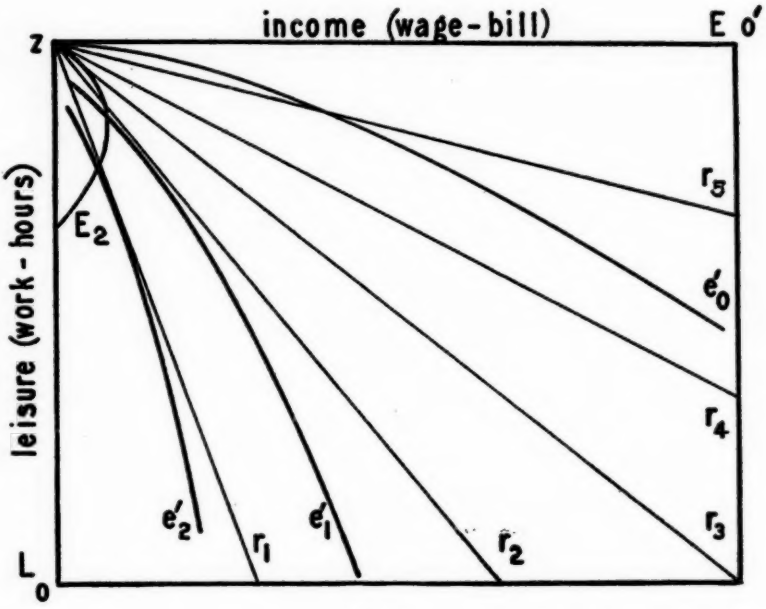

FIG. 4

wage and the other with negative inclination at higher wage levels. Fig. 5 indicates the nature of the indifference map and offer curve upon which this supply curve must be based. Within the area bounded by exchange ratio lines zr_1 and zr_3 there is, strictly, no offer curve as such; any amount of labor would be offered at any given exchange ratio within that range.

On Figs. 6 and 7 the two employer offer curves of Figs. 3 and 4 and the offer curve of labor of Fig. 5 have been superimposed, together with the zero indifference lines in each case (e_0, e_0', and 1_0; the latter is just lower than the exchange ratio zr_1 which itself is identical with the first section of labor's offer curve, L).

It may be noted at once from Fig. 6 that so far as the employers

are concerned, the assumption of perfect elasticity of supply of labor freely competing for jobs immediately grants them (the employers) the maximization of their welfare position, under any given indifference map for labor. This is true regardless of the degree of monopoly power possessed by the employers, since with no limitation on the quantity of work-hours made available at

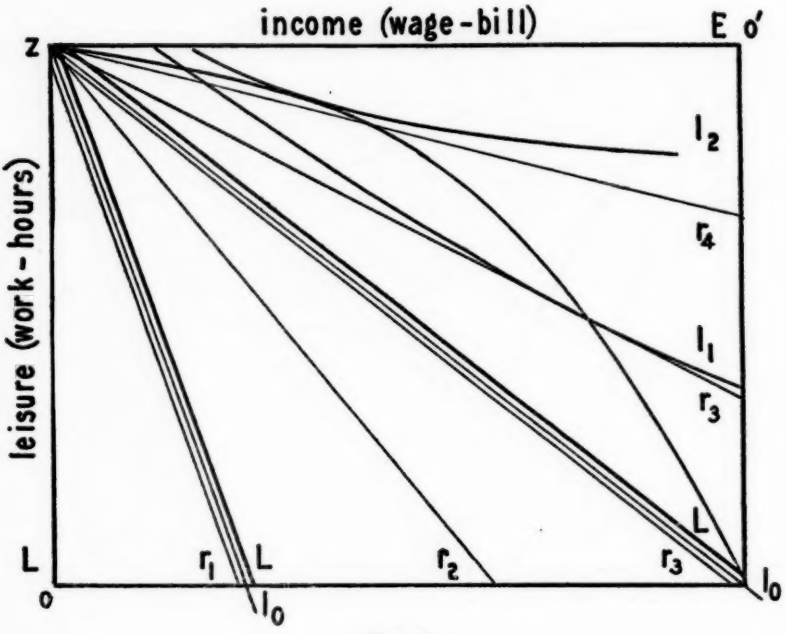

FIG. 5*

* The exchange ratio lines should be numbered consecutively from the left, r_1, r_2, r_3, r_4, r_5, r_6.

any price labor itself will force the exchange ratio down to a location just above their own zero indifference line when confronted with an arbitrarily limited demand for their services. It will be remembered from the earlier discussion that this location is that reached by a monopoly employing an "all-or-none" sales technique; in this case the latter solution is identical with that for a monopoly not bargaining on this basis, since the relevant exchange ratio is identical with the first section of labor's offer curve. But further examination, following the lines of the earlier discussion, reveals some complications:

(1) The case of perfect competition on both sides of the exchange

results in equilibrium at P_1 (Fig. 6) during the harvest season and P_2 during the rest of the year. The employers have no incentive and labor no ability to raise the exchange ratio above these points within the range of indeterminacy zr_1 to zr_3. But it is by no means certain that these points are also possible solutions in the case of bilateral monopoly, with or without "all-or-none" bargaining. An

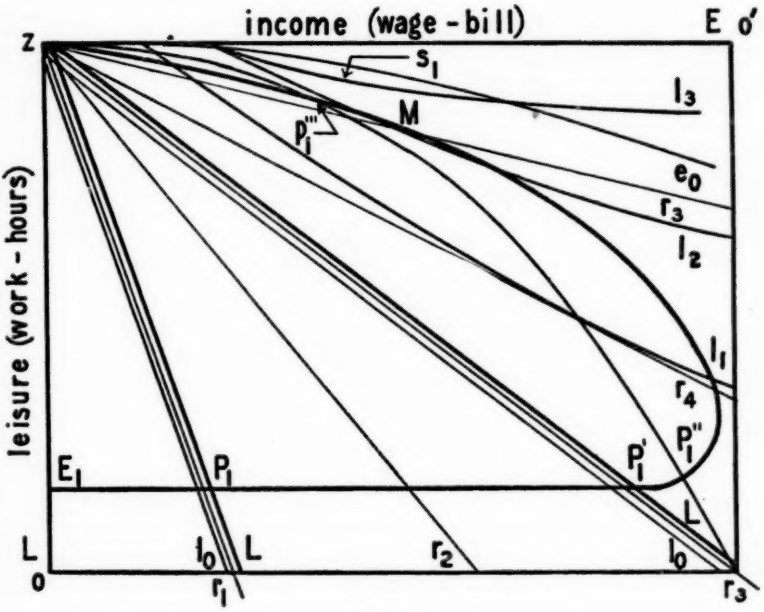

FIG. 6*

* The exchange ratio lines should be numbered consecutively from the left, r_1, r_2, r_3, r_4, r_5, r_6.

immediate effect of union organization may be to raise labor's zero indifference line from zr_1 to zr_3, in order to bring the second, negatively-sloped section of labor's supply curve into relevance (i.e to shift labor's supply curve from the discontinuous function S_1S_1–S_1S_1 in Fig. 2 to the curve $S_2S_1S_1$).

The effect of this change would be to raise the exchange ratio of leisure for income (work-hours for wage-bill), shifting the outcome of the exchange from P_1 to P_1' without changing the amount of leisure given up by labor in the harvest season. Other solutions are possible (i.e., P_1'', P_1'''), all equally "efficient," since they are intersections of offer curves and points of tangency of indifference curves,

and all equally stable. Thus labor, confronted with the inelastic demand of employers up to high wage levels has, a very strong bargaining position compared to employers; but the actual outcome of bargaining in the bilateral monopoly case may depend on external forces to determine which of the multiple equilibrium positions results. These forces may include all those operating on wage

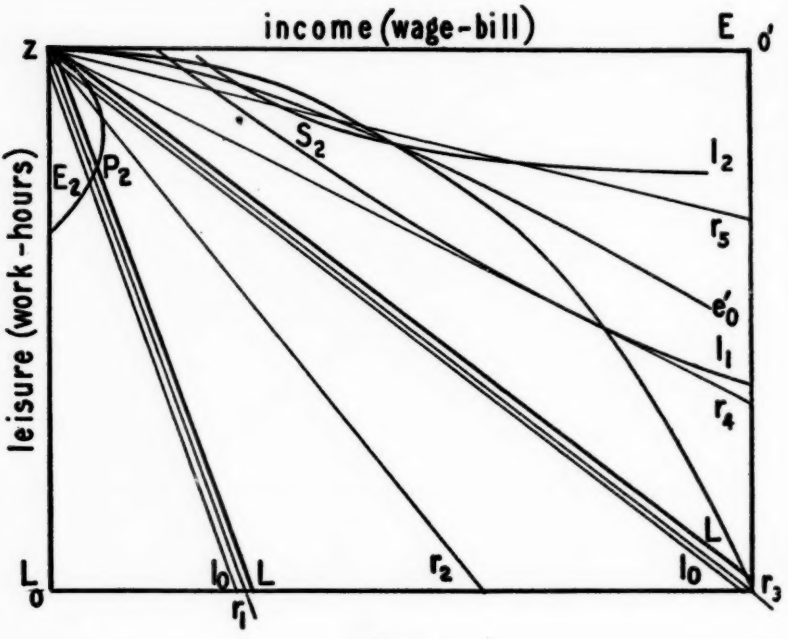

FIG. 7

levels in a complex economy: government policy, public opinion, temporary shortages or excesses of labor supply which become imbedded in the fixed structure of wages, and other considerations.

The above argument applies only to the situation in the harvest season. Given the demand for labor during the rest of the year as described, it is apparent that union wage-fixing at an exchange ratio greater than zr_3 (in Fig. 7) results in complete loss of employment during the off-season. The alternatives open to a union in this regard are discussed briefly below.

(2) A monopsony of employers, as noted above, is a meaningless concept with regard to wage-fixing in the demand and supply

situation described. The inelasticity of employer demand for labor prevents their taking advantage of the elasticity of supply of labor beyond the point of intersection of their offer curve with that of labor; and the offer curve of labor over at least part of its range lies just above labor's zero indifference line, i.e., it is identical with the maximum possible "welfare" position of employers. The only significant effect of employer monopsony, if it dominates a union monopoly on the supply side, is to prevent the latter from raising the price of labor above this position.

On the other hand, a monopoly of labor may raise the exchange ratio of leisure and income, and thus labor's welfare position, to that point where the employer offer curve is tangent to labor's highest possible indifference curve. In Fig. 6, in connection with the harvest season only, this point is at M, on the backward-sloping section of E_1. Thus the limiting solutions in the case of unilateral monopoly or monopsony, or bilateral monopoly where one or the other party completely dominates the bargaining, are M in the case of labor monopoly or domination, and P_1 in the case of employer monopsony or domination. There are in Fig 6. as drawn four equally "efficient" and stable solutions (see discussion of first case); all other points are stable equilibria only insofar as they are fixed for a period of time by contract.

(3) As has already been noted, an employer monopsony bargaining on an "all-or-none" basis can reach no results different from those of pure competition, simple unilateral monopsony, or employer dominance in the case of bilateral monopoly. The employers' maximum welfare position in each of these cases remains P_1 in the harvest season and P_2 (Fig. 7) for the off-season of employment. But a labor monopoly can make further gains, by locating its exchanges at that point just within the employers' zero indifference curve tangent to labor's own highest possible indifference curve. In Fig. 6 these points are represented by S_1 for the period of high employment and in Fig. 7 by S_2, at a lower wage, for the slack season. All such bargains must be at points of tangency of indifference curves and therefore "efficient" solutions; in this case the line connecting such points follows the straight-line section of the employers' offer curve in Fig. 6 and from there a path from P_1'' through P_1''' to S_1. All points of possible solution in the "all-or-none" case are along this line, with the final result in any specific case and at any given time depending on the degree of dominance

or subordinance of one or the other party.

The difficulties involved in the separate seasonal demand schedules may be handled by unions in any one of several ways: (1) they may use the technique of wage discrimination, proposing a lower rate for off-season employment than for peak periods (i.e., locating at P_2 in the slack and P_1' or even S_1 in the peak); (2) they may attempt some compromise rate (as one intermediate between zr_1 and zr_3) in an attempt to maintain some employment for their members during the entire year without unduly complicating their rate structure; (3) they may concentrate their efforts on maximizing the rate during the harvest period (at S_1), ignoring the problem of slack season employment as of little consequence.

Historically, the difficulties of organization of farm workers and of maintaining such organizations over time have been such that the few unions attempting it have generally followed the last of these courses. The Industrial Workers of the World (I.W.W.), for example, concentrated its whole organizing force on farm workers during the harvest season, when it was possible to achieve phenomenal gains; at the conclusion of this period, the union hibernated until the following season again offered opportunity for the exercise of their strongest bargaining weapons. Generally they seem to have operated within the range of inelasticity of demand for labor, and thereby involved their membership in no loss of employment. The great and widely-expressed fear of farm employers, however, has been the possibility of the formation of unions strong enough to take full advantage of their monopoly position, and drive the employers to a no-profit situation season after season.

In summary, analysis indicates that the peculiar demand and supply conditions in the market for seasonal agricultural labor, while to this time resulting in the relatively disadvantaged status of farm workers, hold potentialities of considerable gains by organizations with effective control over the labor supply. These gains may in large part be made without diminishing employment, and may be most effectively concentrated during the peak of seasonal employment. For employers, however, the present situation in the labor market cannot, on theoretical grounds (and referring to the pre-war situation as normal), be bettered, and the principal function of their organization into monopsony forms in this market would be (and in fact has been) to check the development of monopolies on the labor side.

III

The limitations inherent in this type of analysis are apparent in the restrictive assumptions upon which it is based. To some extent, also, the argument may violate Wicksell's dictum that "it is not the proper purpose of science to describe the obvious in elaborate terms."[7]

Nonetheless, analytical abstraction of this nature has considerable value in indicating limits and directions for further study. In the particular case at hand, the starting-point of the analysis lay in demand and supply curves determined by observation of reality. The nature of these curves presupposed certain forms of offer curves, and behind these certain configurations of preference patterns. But in deducing the latter, an abstract apparatus is developed which can serve as a guide and basis for further logical analysis and further research into the problem at hand.

Specifically, among the unanswered questions remaining are the precise nature of trade union and employer goals (i.e., the content of the indifference maps and the factors affecting them), the location of the critical turning points of the offer curves (and therefore of the demand and supply schedules), and the location and shape of the zero indifference curves. The selection of such problems as these must be based on some analytical framework; their relevance to the issue under examination is the test of the usefulness of that framework.

[7] Wicksell, Knut, *Lectures on Political Economy*, Vol. I, p. 19.

RECOVERING THE INVESTMENT IN LIMESTONE*

With Particular Reference to Reimbursement of Vacating Tenants

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INVESTMENTS in soil improvement are of increasing importance in farming. Among these, limestone occupies a major role, largely because it helps to increase the flexibility of farming systems. Many of its benefits are of a secondary nature. For example, lime makes possible the growth of certain legumes, and the yields of other crops are increased primarily as a result of the legumes in the rotation. In this paper, benefit from liming is expressed as the value of increased crop yields. The secondary benefits that result from increased livestock production are excluded.

A more quantitative evaluation of yield response is needed to help in guiding credit and repayment policies relating to investments in limestone, and to determine the reimbursement of tenants for the unexhausted portion of investments they have made. The persistence of response from limestone depends on many factors. These include rate of application, soil and climatic conditions, the farming system, and associated practices. It is usually much longer than the period over which the investment is customarily depreciated as a basis for reimbursement of tenants, or for other purposes. For owner-operated farms the question of the time period is of importance for land-inventory purposes. Another reason for this type of evaluation is that analysis of response to limestone and to many other soil-improvement measures is essential to a determination of economic levels of expenditures for soil conservation.

The problem is of added significance if the investment has been made by a tenant who leaves the farm before the value of the investment is exhausted. Whether it is appropriate to write off the investment over an arbitrarily fixed period depends upon the ratio of benefits to costs during that period. This in turn varies with soil and climatic conditions, the cropping system, and the level of

* The data on which this analysis is based were supplied by Dr. F. C. Bauer, Illinois Agricultural Experiment Station. Mr. Fred L. Garlock, Bureau of Agricultural Economics, furnished some very helpful suggestions.

prices. If the method by which the reimbursement is calculated is geared more nearly to the time period over which substantial benefits may be expected, the tenant has greater assurance that he will receive an appropriate return. Such a method requires the use of data showing the annual yield response of different crops to lime over a period of years, for the cropping system, and for the soil and climatic conditions under which the schedule of reimbursements is to be developed. A method of reimbursement based on a careful appraisal of the residual value of soil-improvement investments should lead to better farm practices, and in turn, to longer periods of tenure.

Problems in Handling Lime Response Data

Data supplied by the Illinois Agricultural Experiment Station, based on work at the West Salem Experimental plots, are used to establish a curve of residual effect. The soil is of low natural productivity, yellow, with a non-calcareous sub-soil. Five series of plots, each carrying a 5-year rotation of small grain, a legume crop, small grain, and corn followed by another legume crop, are available for the comparison so that each year furnishes data for a complete rotation. The comparison is between two plots for each of the five series, one of which was limed in 1912 at the rate of 4 tons per acre. The other plot received no lime. Aside from the liming, the plots were treated alike, with no other soil treatments. Average annual yield differences between limed and unlimed plots for the five series were used as the measure of response.

One of the problems encountered is that of smoothing out annual differences in yields that must be attributed to factors other than the residual effect of the lime. Variations in weather conditions greatly affect the response. A series of 6-year averages of the annual value of the increases in crop yields seemed to give the best basis for a smooth curve (figure 1) to represent the response from limestone over a period of years. The curve is drawn freehand in a way that appears to fit the 6-year average annual value of the increases in yields, as shown in table 1. This table also shows the number of yield observations for each crop, for each 6-year period.

There are a number of limitations to the data in this experiment for purposes of developing a schedule of reimbursements that is consistent with current farm practice. First, conditions that existed in this experiment probably do not represent what would be recom-

mended for good farming today. No manure, or other soil treatments were applied and all of the crops were removed. As the data are not current they may not reflect accurately the response that

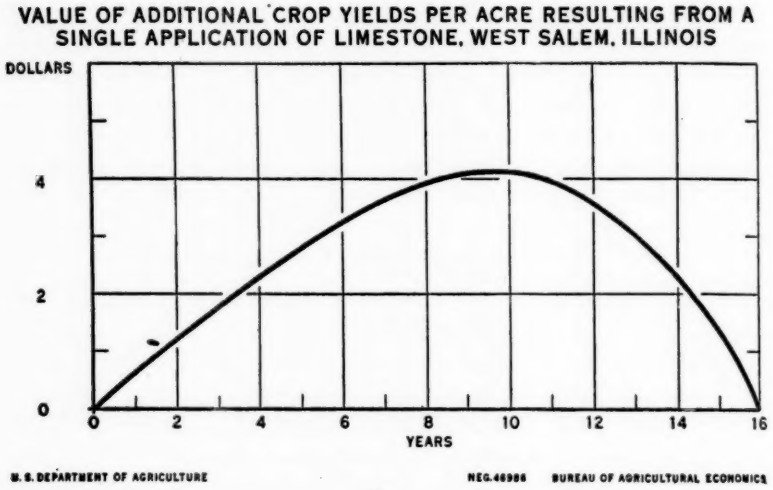

FIG. 1

TABLE 1. NUMBER OF YIELD OBSERVATIONS, BY CROPS, AND AVERAGE VALUE OF INCREASE IN YIELDS PER ACRE FOR EACH OF THREE 6-YEAR PERIODS

6-year period	Number of crops on 5 series of plots				Average annual value of increase yields per acre[2]
	Corn	Oats	Legume[1]	Wheat	
	Number	*Number*	*Number*	*Number*	*Dollars*
1 (1912–17)	6	7	12	5	1.75
2 (1918–23)	6	6	12	6	4.11
3 (1924–29)	6	6	11	7	1.30

[1] The legume crops consisted of both soybeans, and clover, some of which was harvested as seed, and some as hay.

[2] Prices used for corn, oats and wheat are $0.85, $0.50, and $1.20 per bushel, respectively. A price of $13.00 was used per ton of hay and per bushel of clover seed. Soybeans for beans were figured at $1.70 per bushel.

could be expected at the present time. Also, the rate of 4 tons per acre may, under many conditions, be less profitable than, say 2 tons applied more frequently. For these, and perhaps other reasons, the analysis presented here should be considered as illustrative of a method rather than as an accurate description of results that might

be expected under present farm conditions. There is need for data that measure the residual effect of limestone, and of other soil improvements, under generally recommended good farming practices. The question of the relative profitability under different conditions, of making smaller and more frequent, versus larger and less frequent applications of coarser material, may be in need of further testing. It is a question which greatly affects the initial investment, and the period of time over which benefits will occur.

A Suggested Reimbursement Plan

Once the curve of residual effect is determined, the value of past and future benefits at constant prices, may be computed for each year of the period. In the case of the tenant-owner contract, the reimbursement should cover the tenant's share of the investment less depreciation, so that he would retain his share of the net returns obtained during his tenure.

This principle is illustrated in table 2 in which is shown the tenants investment compounded annually, his share of returns computed from the total returns read from the curve of figure 1, and a suggested basis for calculating reimbursements in case he leaves the farm. Past costs and returns are compounded at 4 percent, future returns are discounted at the same rate. Returns are calculated over the entire period indicated in figure 1. A percentage relationship between remaining and total benefits is then established for each year of the period. This percentage (Col. 6) of the investment cost is used to calculate the reimbursement. The reimbursement therefore does not necessarily represent the total residual value of the limestone. For example, the tenant's future returns, which truly reflect the residual gross value of his portion of the investment, are always greater than the reimbursement. The difference between the two represents the gain to the owner, after reimbursing the tenant, as by this transaction, the owner acquires the right to what was previously the tenant's share of the future benefits. But the reimbursement plan should not require the owner to pay more than the original cost of the investment, compounded, times a percentage figure that is believed to represent the proportion of its total income yielding power that remains.

It is not until the eighth year that the value of the tenant's past gross returns exceeds his share of the cost. The reimbursement is calculated so that the tenant bears his share of the depreciation.

TABLE 2. TENANT'S INVESTMENT AND RETURNS PER ACRE FROM LIMESTONE, AND SUGGESTED BASIS FOR REIMBURSEMENT

Year	Tenant's investment cost	Tenant's share of value of increases in yields				Ratio of future to total returns	Calculated reimbursement	Realized returns	Net final returns
		By years	Past	Future	Total				
	1[1]	2[2]	3[2]	4[2]	5	6	7[3]	8[4]	9[5]
1	8.74	0.36	0.37	18.41	18.78	98.0	8.57	−8.37	0.20
2	9.09	0.72	1.14	18.44	19.58	94.2	8.56	−7.95	0.61
3	9.45	1.05	2.27	18.13	20.40	88.9	8.40	−7.18	1.22
4	9.83	1.38	3.80	17.46	21.26	82.1	8.07	−6.03	2.04
5	10.22	1.68	5.70	16.49	22.19	74.3	7.59	−4.52	3.07
6	10.63	1.95	7.96	15.20	23.16	65.6	6.97	−2.67	4.30
7	11.05	2.19	10.56	13.62	24.18	56.3	6.22	−0.49	5.73
8	11.50	2.37	13.44	11.80	25.24	46.7	5.37	1.94	7.31
9	11.96	2.47	16.53	9.80	26.33	37.2	4.45	4.57	9.02
10	12.43	2.47	19.76	7.73	27.49	28.1	3.49	7.33	10.82
11	12.93	2.37	23.02	5.66	28.68	19.7	2.55	10.09	12.64
12	13.45	2.16	26.19	3.73	29.92	12.5	1.68	12.74	14.42
13	13.99	1.83	29.13	2.05	31.18	6.6	0.92	15.14	16.06
14	14.55	1.38	31.75	0.75	32.50	2.3	0.33	17.20	17.53
15	15.13	0.78	33.83	0.00	33.83	0.0	0.00	18.70	18.70

[1] Three-fifths of total cost of 4 tons of limestone at $3.50 per ton, compounded at 4 percent.
[2] Three-fifths of total value of increased yields. Past and future returns are compounded, and discounted at 4 percent, respectively.
[3] Column 6 times the investment cost, column 1.
[4] Column 3 minus column 1.
[5] Sum of columns 7 and 8.

For example, if the tenant leaves the farm at the end of the fifth year his gross returns would be $5.70. This added to the reimbursement of $7.59 gives a total of $13.29. But his cost at that time is $10.22 so that his return after reimbursement would be $3.07 (col. 9). The difference of $2.63 between the tenant's past gross returns ($5.70) and his net final return after reimbursement ($3.07) is his share of the depreciation. The depreciation may also be calculated as the difference between column 1 and column 7.

The principle as illustrated here is based on sharing the initial investment between the owner and tenant in the same proportion as they share in the returns. This appears to be the most feasible way in which the principle may be applied. For example, if the tenant makes all of the initial investment, the reimbursement would need to include not only the residual value of the entire investment, but also an amount that would represent the owner's proper share of the depreciation. This would mean that during the latter part of the period, the reimbursement would exceed the value of the total future returns. During the period the tenant remained, the owner would have received a share in the returns without sharing in the cost. A similar situation would occur if the owner had made all of the initial investment, except that, on leaving, the tenant would be indebted to the owner for the past benefits he had received. Unless both parties are willing to share in the initial investment, it is unlikely that either of them, on termination of the lease, would be willing to reimburse the other for past benefits received without cost.

Effect of a Lighter Application

It was pointed out earlier that the rate of application in this experiment, was heavier than that customarily used where liming is practiced in the farming system. Even though experimental results show a benefit over a long period, there may be question as to the practicability of reimbursement plans that extend over a period of from 10 to 15 years. The question of risk, and the uncertainty as to the nature of the farming system over this long a period may operate to prevent owners and tenants from entering into contracts of this duration. In some cases rental arrangements are stable and both owners and tenants recognize the fact that heavy applications of limestone represent capital investments from which re-

TABLE 3. TENANT'S INVESTMENT AND ESTIMATED RETURNS FROM A 2-TON APPLICATION OF LIMESTONE AND CALCULATED REIMBURSEMENT

Year	Tenant's investment cost	Tenant's share of value of increases in yields				Ratio of future to total returns	Calculated reimbursement	Realized returns	Net final returns
		By years	Past	Future	Total				
	1[1]	2	3	4	5	6	7	8	9
1	4.37	0.36	0.37	7.01	7.38	95.0	4.15	−4.00	0.15
2	4.54	0.72	1.14	6.58	7.72	85.2	3.87	−3.40	0.47
3	4.72	1.05	2.27	5.80	8.07	71.8	3.39	−2.45	0.94
4	4.91	1.38	3.80	4.64	8.44	55.0	2.70	−1.11	1.59
5	5.11	1.68	5.70	3.15	8.85	35.6	1.82	0.59	2.41
6	5.31	1.95	7.96	1.33	9.29	14.3	0.76	2.65	3.41
7	5.52	1.38	9.71	0.00	9.71	0.0	0.00	4.19	4.19

[1] Three-fifths of total cost of 2 tons of limestone at $3.50 per ton, compounded at 4 percent. (Data for other columns derived as in table 2).

turns are as real as are those from other farm improvements such as buildings. Under these conditions, and where there is evidence that heavy applications less frequently made, are profitable, long term reimbursement plans are thoroughly justified.

But generally, a time period of the length illustrated in table 2, will not find ready acceptance. Therefore, an adaptation of the data is made in order to illustrate what the situation might be with an application half as large. In this case the assumption is that the annual benefits up to the time they begin to decline, will be the same as when 4 tons are applied. This assumes that the heavier rate was double the quantity needed to bring about the optimum soil reaction, or to supply as much lime as the plants would use each year. It is probable that a larger proportion of the lime would consist of the finer particles, if the lighter application were used. Only a part of any application will become effective each year, the balance remaining as unused material for future use, or some may be lost through leaching depending on the type and fineness of material applied and on soil and climatic conditions. There may be question as to whether table 3 expresses the response that would be obtained from 2 tons of limestone, under conditions similar to those which gave the response indicated in table 2 when 4 tons were applied. However, table 3 is shown in order to illustrate a reimbursement schedule that more nearly conforms to the general practice of applying lime not less frequently than from 7 to 10 years.

If table 3 is assumed to represent the effect of only 2 tons of limestone applied under conditions of the experiment, the tenant's past gross returns will exceed his cost in the fifth year. This is 3 years earlier than when 4 tons are applied, because the annual benefits are assumed to be the same until they have reached the maximum, while the cost is only half as much as for 4 tons. But the benefits from 2 tons are assumed to cease at the end of the seventh year. As in the case of table 2, the value of future returns is always greater than the reimbursement.

Position of Tenant and Owner

The position of both tenant and owner is shown in table 4 for each year of the period over which a reimbursement would be made in case the tenant leaves. Net returns shown in this table are derived by subtracting the cost, compounded, from the sum of all past and future gross returns. The reimbursement has been added

TABLE 4. POSITION OF OWNER AND TENANT AT THE END OF EACH YEAR DURING THE PERIOD OVER WHICH REIMBURSEMENT WOULD BE PAID

A. Based on a 4-ton application (table 2)

Year	Owner's gross returns at the end of each year[1]		Owner's share of cost	Value of past and future net returns			
				Tenant leaving		Tenant remaining	
	Past compounded	Future discounted		Tenant	Owner	Tenant	Owner
	1	2	3[1]	4[2]	5[3]	6[4]	7[5]
1	0.25	12.27	5.83	0.20	16.53	10.04	6.69
2	0.76	12.29	6.06	0.61	16.87	10.49	6.99
3	1.52	12.08	6.30	1.22	17.03	10.95	7.30
4	2.53	11.64	6.56	2.04	17.00	11.43	7.61
5	3.80	10.99	6.82	3.07	15.87	11.97	7.97
6	5.31	10.13	7.09	4.30	16.58	12.53	8.35
7	7.04	9.08	7.37	5.73	16.15	13.13	8.75
8	8.97	7.86	7.67	7.31	15.59	13.74	9.16
9	11.08	6.53	7.98	9.02	14.93	14.37	9.58
10	13.18	5.15	8.29	10.82	14.28	15.06	10.04
11	15.35	3.77	8.62	12.64	13.61	15.75	10.50
12	17.46	2.49	8.97	14.42	13.03	16.47	10.98
13	19.43	1.36	9.33	16.06	12.59	17.19	11.46
14	21.16	0.50	9.70	17.53	12.38	17.95	11.96
15	22.55	0.00	10.09	18.70	12.46	18.70	12.46
B. Based on a 2-ton application (table 3)							
1	0.25	4.68	2.91	0.15	4.88	3.01	2.02
2	0.76	4.39	3.03	0.47	4.83	3.18	2.12
3	1.52	3.86	3.15	0.94	4.64	3.35	2.23
4	2.53	3.09	3.27	1.59	4.29	3.53	2.35
5	3.80	2.10	3.41	2.41	3.82	3.74	2.49
6	5.31	0.88	3.54	3.41	3.22	3.98	2.65
7	6.48	0.00	3.68	4.19	2.08	4.19	2.80

[1] Owner's share (2/5) of total returns and of investment cost.
[2] Net final returns after reimbursement, from column 9 of tables 2 and 3.
[3] Owner's total returns plus tenant's future returns, less sum of reimbursement and owner's share of cost.
[4] Tenant's past and future returns less cost.
[5] Owner's past and future returns less cost.

to the tenant's gross returns and to the owner's costs, in computing net returns to the tenant and owner, respectively, when the tenant leaves.

As has been pointed out, the owner's net returns after reimbursing a vacating tenant, include the future returns the tenant would have received had he remained. This presents a problem to the owner in working out arrangements with a new tenant. Unless he

can shift the reimbursement cost to the new tenant, he will have paid for the right to returns he will not receive. This would put the owner in a position somewhat comparable to that of the tenant who is not paid for an unexhausted portion of the investment. This presents another angle to the question, and emphasizes the need for more accurate data on response to and residual effects of soil improvement measures. Only after enough good data are accumulated, and the analysis given popular treatment, can there be general recognition and sanction by custom or law, of satisfactory arrangements for the division of costs and benefits. The same can be said with regard to the problem of sharing the costs of soil conservation measures between the individual and the public. This is a policy decision to be made by elected representatives. But a more solid basis than now exists is needed as a guide in making the decision.

What the vacating tenant sacrifices, even under the plan suggested, is seen by comparing columns 4 and 6 (table 4), the latter including the discounted value of all future net returns he would receive if he remained throughout the period of residual effect. Columns 6 and 7 of this table show that if the tenant remains throughout this period, he and the owner share in the returns in the same proportion as they share in the investment. However, if the tenant leaves before the value of the investment is exhausted, the ratio of his returns to the total returns will be less than his share of the cost.

Provision for reimbursement in accordance with the principle illustrated here would largely remove the element of risk on the part of the tenant. Even though fortuitous circumstances may result in higher than normal net returns soon after application (which would also benefit the owner), there is always the possibility that unforseen developments may prevent any return over a short period. The plan suggested would operate as a safeguard against such a contingency.

Comparison with "Straight-Line" Depreciation Plan

The vacating tenant's investment is often not adequately protected by plans that provide for "straight-line" depreciation based on the original cost. A plan sometimes suggested stipulates the "writing off" of one-fifth of the original investment each year. Thus, at the end of the first year, the reimbursement would be four-fifths

of the original cost, the second year three-fifths, the third year two-fifths, and if the tenant should leave at the end of the fourth year the payment would be one-fifth of the original investment. No reimbursement is made after the fourth year. This plan has been suggested for use when the tenant has paid for all of the lime applied, so that the reimbursement actually includes payment for what should be considered the owner's share of the investment in the first place. Applying such a plan to the illustration used in this paper, table 5 shows the reimbursement, this plus the tenant's past gross returns, the costs, and the net final returns after reimbursement.

TABLE 5. REIMBURSEMENT, AND RETURNS PER ACRE TO TENANT UNDER A 4-YEAR PLAN

Year	Investment shared				Investment not shared			
	Reimbursement	Total gross receipts	Tenant's cost	Net final returns	Reimbursement	Total gross receipts	Tenant's cost	Net final returns
	1[1]	2[2]	3[3]	4	5[1]	6[2]	7[3]	8
A. With 4 tons of limestone applied per acre								
1	6.72	7.09	8.74	−1.65	11.20	11.57	14.57	−3.00
2	5.04	6.18	9.09	−2.91	8.40	9.54	15.15	−5.61
3	3.36	5.63	9.45	−3.82	5.60	7.87	15.75	−7.88
4	1.68	5.48	9.83	−4.35	2.80	6.60	16.39	−9.79
B. With 2 tons of limestone applied per acre								
1	3.36	3.73	4.37	−0.64	5.60	5.97	7.28	−1.31
2	2.52	3.66	4.54	−0.88	4.20	5.34	7.57	−2.23
3	1.68	3.95	4.72	−0.77	2.80	5.07	7.87	−2.80
4	0.84	4.64	4.91	−0.27	1.40	5.20	8.18	−2.98

[1] Original investment depreciated one-fifth at the end of each year.
[2] Reimbursement, columns 1 or 5, plus tenant's past gross returns, compounded.
[3] Original investment compounded.

Minus net final returns indicate that the plan sometimes suggested depreciates the investment at a more rapid rate than is compensated for by past gross returns. When 4 tons were applied, benefits continued for 15 years, yet the plan illustrated in table 5 assumes that one-fifth of the investment would be exhausted each year. Because returns from a 2-ton application are assumed to be just as large until they begin to decline, the tenant's position would be less unfavorable under a "straight-line" plan of depreciation, than when the larger investment is made. During the period of rising benefits, the assumed past gross returns relative to cost, are higher in the case of the lighter application. Therefore, with a 2-ton rate of application, the minus net final returns become smaller

before the end of the period, when the investment is shared. When the investment is not shared, the tenant's cost is increased but his share of the returns remains the same. So within the short period covered by table 5, the tenant's losses continue to grow larger for both rates of application when the investment is not shared.

Plans frequently recommended, when applied to this illustration, would not provide for sufficient returns to cover the cost, when the reimbursement is added to the cumulative value of the tenant's share of increased yields. It would be more appropriate to base reimbusements on curves of residual effect that are generally applicable to conditions under which the farm is operated, and that indicate the rapidity and persistence of response that may be generally expected.

Practical Application of the Plan

Obviously, calculations such as are used in this analysis cannot be conducted for individual cases. However, once a curve of residual effect has been established, and the calculations conducted for a type of situation that is representative of conditions in an area, a simple adaptation of the method may be applied quickly in practice. This could be done by expressing the reimbursement for all years as percentages of the original investment. These percentages can then be multiplied by the original investment in order to calculate quickly the reimbursement for the unused portion of limestone for any farm to which a particular curve of residual effect is applicable. Analysis of reliable data that show residual effects under different soil and climatic conditions and different farming systems, is needed in order to provide guides for reimbursement schedules in all areas where the use of limestone is profitable.

Added Capital Value

The productive value of land is derived through discounting the expected future annual returns. The owner's share of the discounted future net returns from the investment represent the added capital value. Table 6 shows the owner's share of the annual gross returns, costs, net returns and added capital value. For the purpose of determining the added capital value, interest on the residual value of the investment is included as a cost (along with depreciation), in obtaining annual net returns. Data for the left, and for

the right portions of this table, correspond with the annual return and the annual depreciation indicated in tables 2 and 3, respectively. The owner's share of two-fifths of the entire increase in yield, is equivalent to two-thirds of the tenant's share as shown in column 2 of those tables. The annual rate of depreciation on the owner's share of the initial investment is derived by taking the differences between the successive annual ratios of future to total returns, in column 6 of tables 2 and 3 (table 6).

TABLE 6.—OWNER'S ANNUAL GROSS RETURNS, COSTS, NET RETURNS AND ADDED CAPITAL VALUE PER ACRE FROM INVESTMENT IN LIMESTONE

Year	4-ton application Owner's investment $5.60 per acre				2-ton application Owner's investment $2.80 per acre			
	Owner's share of gross returns[1]	Owner's costs[2]	Owner's annual net returns	Added capital value[3]	Owner's share of gross returns[1]	Owner's costs[2]	Owner's net returns	Added capital value[3]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1	0.24	0.33	−0.09	6.50	0.24	0.25	−0.01	1.93
2	0.48	0.43	0.05	6.85	0.48	0.38	0.10	2.01
3	0.70	0.41	0.29	7.07	0.70	0.48	0.22	1.98
4	0.92	0.58	0.34	7.07	0.92	0.55	0.37	1.86
5	1.12	0.62	0.50	7.00	1.12	0.60	0.52	1.37
6	1.30	0.66	0.64	6.78	1.30	0.64	0.66	1.09
7	1.46	0.67	0.79	6.41	0.92	0.42	0.50	0.48
8	1.58	0.67	0.91	5.86				
9	1.65	0.63	1.02	5.20				
10	1.65	0.59	1.06	4.40				
11	1.58	0.53	1.05	3.50				
12	1.44	0.44	1.00	2.60				
13	1.22	0.36	0.86	1.71				
14	0.92	0.25	0.57	0.91				
15	0.52	0.13	0.39	0.37				

[1] Two-thirds of the tenant's annual gross returns as shown in column 2 of tables 2 and 3.

[2] Includes annual depreciation based on differences between successive annual ratios of future to total returns, column 6 of tables 2 and 3; and interest on unexhausted balance of original investment.

[3] Value at beginning of each year, of all future net returns discounted at 4 percent.

The owner's future annual net returns from the investment (after depreciation and interest on the unexhausted value of the investment) are discounted at the beginning of each year, to obtain added capital value. Thus, when 4 tons of lime are applied, there are in the first year, 15 annual future net returns to be discounted; 14 in the second year; 13 in the third year, etc. Where 4 tons of

lime are applied, these values are higher in the second to sixth years inclusive, than in the first year, because annual returns are rising at a sufficiently rapid rate to offset the fact that fewer of them are forthcoming. Similarly, when 2 tons are applied, the discounted value of future net returns is higher in the second and third years than in the first year. For each rate of application there is a minus net return in the first year. Also, in the discounting process, each year's returns have a higher value in the year of their occurrence than in the preceding years. Thus, the amount of additional capital value in any year depends on the shape of the curve of residual effect as well as on the total amount and duration of returns. The added capital value is much greater after the 4 ton, than after the 2 ton rate of application because the period of returns is longer. Net returns as used in table 6 do not include the accumulated interest on past returns. Hence, the benefit to the owner in the form of returns received is shown in table 4 rather than in table 6. As with all capital inputs, there is the problem of determining the amount of investment that will yield highest net total returns. This is important to all farmers, whether their interests are limited to current income, or whether they also have an investment in land.

It is true that the added capital value which results from soil improvements such as limestone are not fully recognized. Thus in the land market, the owner may not always be able to "sell" the investment for its proper worth, either in the form of a higher rental share or a sale price that reflects the proper rating of the land in comparison with less productive land in the community. The value of soil improvement investments can be reflected in land prices and rental rates only as buyers and sellers, and owners and tenants recognize their contribution to future income. There is need for research and extension efforts that will make such contribution more widely recognized. Local committees could serve a useful purpose in focusing attention on the proper value of soil-improvement investments. They could suggest appropriate differentials in land values and rental rates for lands of similar physical characteristics and potential yielding capacities, but which vary in actual productivity because of differences in capital investments for soil improvements. Such committees could have only advisory functions and should be composed of qualified farmers. State laws could well make provision for their existence in order to give them appropriate public recognition. In some cases their function could

be carried out within the framework of existing soil conservation districts. The basis for the work of these committees should be the results of experimental work that show the quantity and duration of increases in crop yields that may be expected as a result of specified investments in soil improvement.

Summary

Much of the land that needs additional investment for soil improvement is operated by tenants. It is desirable that the investment be made jointly by the owner and tenant in the same proportion as they share in the returns and that the reimbursement include full credit for the unexhausted value of the tenant's share of the investment at the time he leaves the farm. Progress toward the establishment and maintenance of systems of farming that permit greater income stability will be greatly advanced by general acceptance of the use of lease contracts that will assure the tenant of equitable reimbursement for the unexhausted value of improvements he has made. Local advisory committees having legal status could become an effective part of an educational program to bring about general recognition of the facts relating to the capital value of investments in soil improvements.

NOTES

FARM LABOR DURING WORLD WAR II

PROBABLY no other area of economic activity was given more consideration with respect to the maintenance of its labor supply during World War II than agriculture. It was given special consideration in the drafting of men for the armed services; it secured foreign workers to help in the crop harvests; it had special laws enacted—Federal, as well as State and local—which prevented the recruitment of farm workers for employment in either other agricultural areas or industry.

It is the purpose of this paper, first, to examine the farm employment situation prior to America's entry into the war; second, to summarize the various methods employed to maintain the existing labor force; third, to evaluate the need for the special considerations mentioned in the preceding paragraph; and fourth, to point to possible alternative methods which might have been utilized which would have achieved the same purpose, namely, greater food production.

Extent of Unemployment and Underemployment: 1940

Prior to America's entry into the war, there was a large reservoir of unemployed and underemployed farm workers. A Congressional Committee, after extensive hearings, concluded that in 1940, there was "a reserve of unused or ineffectively used manpower pressing upon the agricultural labor market of at least 5,000,000 workers."[1] This figure included about 2,500,000 workers who were ineffectively used and another 2,500,000 workers who were unemployed.[2]

Changes in Farm Employment 1940–1943

Between 1940 and 1943 farm workers were lost to war industries and the armed forces. Furthermore, total farm population declined about 3,600,000 during the first few years of the war—1940 to 1943.[3] Despite these movements, however, average farm employment in 1943 was only 322,000 less than in 1940, and only 100,000

[1] *Report of the Select Committee to Investigate the Interstate Migration of Destitute Citizens*, 77 "Congress, 1st Session, House Report No. 369, 1941, p. 403.
[2] *Ibid.*, p. 402–3.
[3] U. S. Department of Agriculture, *Agricultural Statistics*, 1947, p. 499.

less than in 1941, the reduction being chiefly among family workers.[4] The replacement of workers consisted primarily of inexperienced women and children.[5] Although the efficiency of some of these workers was not equal to that of the workers whom they replaced, one may note that in 1943, the output per worker was about 21 percent greater than in 1940.[6]

Given the fact that by 1943 there had been no serious depletion of the labor force it might be argued that there was a need for additional workers to meet the requirements of a greater agricultural production, since between 1940 and 1943 agricultural production had risen by about 16 percent.[7] But this increased production was more than compensated for by the increased productivity of farm workers. The increased productivity reflected better utilization of the then existing farm labor force, increased hours of work per week, as well as increased mechanization.

From January 1, 1940 to January 1, 1943 the number of tractors on farms rose from 1,545,000 to 2,100,000, or more than one-third.[8] It has been estimated that about 150 man-hours annually are saved by each farm tractor.[9] One can estimate, therefore, that the added 555,000 tractors contributed over 83,000,000 man-hours of work. Incidentally, this does not take into consideration the additional man-hours contributed to agricultural production as a result of the Government's campaign for greater utilization of existing equipment through pooling and exchange among farmers.

Weighing all the above factors, it is not unreasonable to conclude that whatever losses there were in farm employment during 1940–43 were at least compensated by other factors. Furthermore, one must also recognize the fact that in the year 1943 there was still considerable unemployment and underemployment.

Extent of Unemployment and Underemployment 1943

It was estimated in 1943 that about 15 percent of the farm workers, or roughly 1.5 million, could be spared for employment else-

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[4] United States Department of Agriculture, Bureau of Agricultural Economics, *Farm Labor*, August 12, 1948 (mimeographed) p. 6.

[5] Louis J. Ducoff, *Wages of Agricultural Labor in the United States*, U. S. Department of Agriculture, Technical Bulletin No. 895, July 1945 ,p. 23.

[6] *Ibid.*, p. 16.

[7] U. S. Department of Agriculture, *Agricultural Statistics*, 1947, p. 532.

[8] *Ibid.*, p. 550.

[9] Barger, Harold and Landsberg, Hans H., *American Agriculture*, 1899–1930, p. 265.

where.[10] This group was comprised of farm operators and farm workers whose contribution to farm production was negligible. The extent of this underemployment of farm workers in 1943 was confirmed by several studies made by the U. S. Department of Agriculture.

One study revealed that there were from 63,000 to 98,000 available workers in 33 Eastern Kentucky counties on December 1, 1942 who "might properly be considered potentially available for more productive work than their farming operations permit."[11] Another survey of the Appalachian Region indicated that in five states, (West Virginia, Virginia, North Carolina, Tennessee, and Kentucky) there were "about 450,000 workers, including approximately 300,000 rural farm males of working age, who could be made available either in agriculture elsewhere, or in industry, for more productive war employment than they now have."[12]

In addition to workers who could have been spared from the farms, these were hundreds of thousands who were idle for protracted periods of time. The Appalachian Region study indicated that an average annual employment of about 821,000 able-bodied adult males could meet the labor requirements for the 1943 farm production goals in the Appalachian area. Yet the estimated annual employment for the region was about 1,300,000, an excess of 475,000. "Seasonably, this surplus of manpower (the report concludes) is estimated to vary from 250,000 man-equivalents in October to somewhat over 600,000 in months like January and February."[13]

This condition, of course, was typical for the entire South. As a rough indication of the extent of poor utilization of the farm labor force in the South one can cite the fact that the Southern states employ about 50 percent of all farm labor but produce for the market only about one-fourth of the farm products, measured in terms of cash receipts from farm marketings.[14]

Despite the existence of huge surpluses of farm workers, legisla-

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[10] Schickele, Rainier, *Manpower in Agriculture*, Iowa State Agricultural College, 1943, p. 14.
[11] United States Department of Agriculture, Bureau of Agricultural Economics, *Manpower for War Work, Eastern Kentucky*, May 1943, p. 1.
[12] United States Department of Agriculture, Bureau of Agricultural Economics, *Manpower and Agricultural Resources in the Appalachian Region*, June 1943, p. 44.
[13] *Ibid.*, p. 16.
[14] U. S. Department of Agriculture, *Agricultural Statistics* 1947, p. 503, 540.

tion was enacted and various social, political, and economic barriers were either maintained or strengthened so as to "freeze" workers in their areas and jobs. These will be examined in turn.

Deferment of Farm Operators and Farm Workers

The Tydings amendment to the Selective Service Act provided for the deferment of every registrant found by a local draft board to be necessary to and regularly engaged in an agricultural occupation or agricultural endeavors essential to the war effort so long as he remained engaged in them and until such time as a satisfactory replacement could be obtained.

The amendment further provided that if any registrant left his occupation or endeavor, the local draft board could reclassify him in a class immediately available for military service unless he secured from his board a statement that it was in the best interest of the war effort for him to leave such occupation or endeavor for other work.

The most significant aspect of the passage of this amendment for the deferment of farm workers was that the policy was adopted by Congress on the basis of information which later proved to be incorrect.

On February 22, 1943, in response to a series of questions asked by Senator Bankhead, the Secretary of Agriculture submitted the results of a survey based on replies of about 2,800 county agricultural agents. The information received from the county agents was influential in securing the passage of the Tydings amendment.[15]

According to the Senate report, about 99 percent of the county agents indicated that "farm labor had been appreciably reduced by being absorbed by the military forces or industry." Furthermore, about 73 percent of the agents reported that there had been no replacement of farm workers who had left farms during the preceding two years. These conclusions, it may be noted, are contrary to the information set forth previously.

The county agents also estimated that there were "slightly more counties where the labor loss has been heavier to the military forces

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[15] See Report of Senate Military Affairs Committee on Deferment from Military Service of Persons Engaged in Agricultural Occupations, 78" Congress, 1st Session, March 5, 1943. The report of the Committee contains the results of the county agents' survey.

than to industry." This conclusion seemed to indicate that the major loss was due to the draft. Actually, General Hershey, of Selective Service System, estimated that 15 percent of the persons who had left farms had gone into the armed forces. Senator Hayden, of Arizona, estimated that the percentage was about 25 percent, on the basis of information submitted by the Department of Agriculture and the Selective Service System.[16]

The survey of the Department of Agriculture showed further that "a large percentage of the individual agents' answers indicated that such labor as had been available to replace labor lost was very largely inexperienced and inefficient." The increased productivity of workers during the period (discussed above) contradicts this conclusion. About 71 percent of the county agents "indicated that there would be a reduction in the acreage in cultivation in 1943." This prediction was obviously wrong since the acreages of 52 crops planted or grown in 1943 were higher in 1943 than in 1942.[17] It is clear that every conclusion and prediction of the county agents was incorrect. Yet it was from such "facts" that the legislation on deferment of farm workers was enacted.

In order to determine whether or not a farm worker or farm operator should be deferred a yardstick was adopted to assist the local draft boards. The Department of Agriculture and the War Manpower Commission adopted a war-units plan. A list of essential and non-essential products was drawn up (the non-essential products included a handful of small and unimportant crops). War units for the production of essential products were based chiefly on the amount of labor required. At first it was decided that a worker would have to contribute 16 war-units to be considered for deferment. Later, this rule was relaxed to 8 war-units, with the local boards still having considerable discretion.

The effects of the Tydings amendment and the Selective Service procedures adopted were threefold: first, they "froze" workers in their jobs without any consideration being given as to their actual necessity; secondly, they provided a haven for draft-dodgers; and thirdly, they placed on industry the entire burden of contributing manpower to the armed services.

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[16] Hearings Before a Subcommittee on the Committee on Appropriation, United States Senate, 78th Congress, First Session, on *Investigation of Manpower*, Part I, p. 216.

[17] U. S. Department of Agriculture, *Agricultural Statistics* 1947, p. 514.

A report of the Iowa State Agricultural College on "Manpower in Agriculture" pointed out that "there are relatively few farms with draftable men where the output per worker falls below 8 units." Furthermore, the report states that "on the better and more highly mechanized farms more workers are kept on farms than are really needed, because there a worker can readily produce 25 or 30 war units instead of 8."[18]

The Selective Service System estimated that by December 31, 1943, about 3,032,000 men in agriculture would be deferred under the Tydings amendment.[19] As of July 1, 1943, nearly 1,500,000 men had already been deferred on the basis of the Tydings amendment, of whom substantially more than a third were in the South.[20]

Selective Service regulations also provided for the deferment of workers who shifted into agriculture, thereby providing a haven for draft-dodgers. According to scattered reports, such a movement back to the farms did take place. A survey conducted by the Bureau of Agricultural Economics indicated that "from January to April (1943), approximately 110,000 men shifted to farm work from other occupations, in excess of the number who otherwise would have made such a shift."[21] The War Manpower Commission reported that "the industries chiefly affected in this transfer and the seasonal movement back to the farm, were aircraft, shipbuilding, ordnance, non-ferrous metal mining, lumber, and logging. The effect of the shift to agricultural activities on the staffing of war plants varied throughout the country. Those areas which had tight or critical labor supply situations before the exodus of workers to farms were more seriously affected than those areas which had experienced only minor manpower difficulties prior to January."[22]

The California Weekly Agricultural Labor Market Report of April 6, 1942 stated that "within the last month about 1,000 inquiries have been received by USES offices from industrial workers, and from army personnel over 38, who are willing to return to the farm, less than a third of them have inquired expressly for dairy farm work."

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[18] P. 10.

[19] Hearings Before A Subcommittee of the Committee on Appropriations, United States Senate, 78th Congress, First Session, on *Investigation of Manpower*, Part 1, p. 104.

[20] Figures submitted by the Selective Service System.

[21] U. S. Department of Agriculture, B.A.E., *Shifts of Males of Military Age to Agricultural Work*, July 5, 1943.

[22] War Manpower Commission, *The Labor Market*, June 1943, p. 14.

In the South thousands of Negro farm workers were drawn into war construction work after the outbreak of war. When this work was completed, according to reports of the War Manpower Commission, many of these workers returned to the farms in order to secure draft deferment, despite the large number of unfilled orders for men in war industries.

Under the regulations, local draft boards prepared lists of persons who were in the IV-F classification or who were 38 years of age or over, who had previous farm experience and who were employed in non-deferrable occupations and non-essential activities. Form letters were prepared and transmitted to such persons explaining the possibilities for deferment as agricultural workers and pointing out that failure to get in touch with a local war board may result in induction into the armed forces, regardless of age or disability. There were a few instances where letters were mailed to persons employed in a zinc mine in Virginia, a U. S. arsenal in South Carolina, and in the petroleum industry.[23]

The Tydings amendment also placed a heavy burden on industry to supply the armed forces with manpower. Prior to the enactment of the amendment, farm employment represented about 25 percent of total employment. Yet, only about 13.7 percent of the members of the armed forces came from agriculture. In other words, agriculture had contributed only one-half of its normal share to the armed forces. Despite this lenient policy, the Tydings amendment was enacted, virtually stopping this source of recruitment. It meant that workers engaged in non-essential farm work were deferred while workers in war industries were drafted.

It is significant that as of July 1, 1944, agriculture with its surplus of manpower had 17 percent of the employed civilians deferred for occupational reasons, while industry had about 9 percent deferred for similar reasons.[24]

Farm Labor Act of 1943 (Public Law No. 45)[25]

A nation at war should consider its manpower as being in one national reservoir from which can be drawn workers for agriculture, industry, and the armed forces. Yet the Farm Labor Act of 1943

[23] The War Food Administrator on June 8, 1943 wrote a memorandum to State War Board Chairmen criticizing this activity.

[24] Walter W. Wilcox, *The Wartime Use of Manpower on Farms*, this JOURNAL, August 1946, Vol. XXVIII, No. 3, p. 728.

[25] Public Law 45, 78" Congress, First Session.

was directed toward keeping local labor supplies "frozen" and created more than 3,000 separate reservoirs of labor. The Pace amendment to this law provided that:

"No part of the funds . . . appropriated should be expended for the transportation of any worker from the county where he resides or is working to a place of employment outside of such county without the prior consent in writing of the county extension agent of such county, if such worker has resided in such county for a period of one year or more immediately prior thereto and has been engaged in agricultural labor as his principal occupation during such period."

This provision violated a fixed principle of efficient labor utilization, namely, that employment can only be decasualized by setting up a single labor reservoir.

Public Law #45, particularly the provision mentioned above, was also enacted as a result of misinformation concerning the farm labor situation. This misinformation was similar to that reported in the county agents' survey. For example, there was considerable discussion—in the newspapers and other places—about farm labor *losses* without any explanation of the fact that there had been *replacements*. In addition, there was talk about a "need" for 3.5 million farm workers. Many believed this to mean a "shortage" of 3.5 million workers. Actually, this "need" merely represented the total number of farm workers who are normally mobilized each year to meet the harvest needs at the seasonal peaks. The experience in 1943 revealed that this mobilization took place.

The provision requiring the approval of the county agent before a worker can be transported into other areas by the Federal Government meant that very few, if any, workers were given such permission. There were reports that county agents feared the loss of their jobs if they certified the existence of a farm labor surplus. A memorandum of the Extension Service stated that "states and counties are loath to certify areas of recruitment." As a result of the "freezing" policy the nation turned to foreign workers for new sources of labor. This simply meant that American workers were idle and underemployed while foreign workers received employment.

Thus, the large reservoir of surplus farm labor in the South was dried up with the passage of this law. A global war, in effect, was being fought on a county basis.

Certain conclusions can be drawn from the operation of the Pace amendment and the use of foreign workers. First, there was a

tendency to bring foreign labor into the United States without any knowledge as to where it would be placed. One net effect was that foreign workers were idle for long periods of time. For example, over 1,000 Jamaicans were brought into Michigan and then forced to seek work outside of agriculture. Secondly, although the importation of foreign workers supposedly took place only after all sources of domestic labor were tapped, some county agricultural agents found it easier to order foreign workers than to put on an intensive recruiting campaign for domestic workers.

State Emigrant Agent Laws[26]

One of the most serious barriers to movement of workers across state lines is the Emigrant Agent Law. Such a law was in existence in twelve states in 1942. Eleven of these states are located within the South. The other state is Pennsylvania. These laws were presumably enacted in order to regulate the recruitment of labor for use outside the state. But, with the exception of Pennsylvania, they were obviously intended to prevent or to discourage the movement of labor outside the state. The chief device employed was the excessive license fee, with punishment for violation under the criminal code. In Pennsylvania, the law specifically states conditions under which emigrant agents may operate, and there is only a nominal fee attached. A tabulation of these acts, showing state, date of enactment, license fee, and other information, is shown below:

State	Date of Enactment	License Fees (annual)	Remarks
Alabama	1923	$5,000 Up to $2,500 may be levied by counties in addition	Violation a misdemeanor
Florida	1927	$2,000	Violation punished by maximum of 1 year prison or $5,000 fine.
Georgia	1933	$1,000 for each	$1,000 bond
Louisiana	1938	$500	$5,000 bond. Must give commissioner of labor data on place to be taken, for what purpose, duration, whether transportation provided, etc.

[26] For an excellent discussion of this problem see Roback, Herbert, *Legal Barriers to Interstate Migration*, Cornell Law Quarterly, Volume 28, Nos. 3, 4.

State	Date of Enactment	License Fees (annual)	Remarks
Mississippi	1930	$500 for each county	—
North Carolina	1935	$500 for each county; $100 to $500 add. in towns and cities; counties and cities may levy equal amounts	Violation a misdemeanor
Pennsylvania	1935	(nominal)	Same as Louisiana
South Carolina	1932	$500 for each county	Violation a misdemeanor
Tennessee	1923	$300	—
Texas	1936	$1,000 (minimum)	Violation a misdemeanor
Virginia	1930	$500 plus $5,600 for each county	Violation a misdemeanor
West Virginia	1931	$5,000	—

In view of the large fees it is clear that very few licenses would be taken out. With the apparent changed farm labor situation a campaign of strict enforcement of the laws was begun during the early war years.

Effect of the "Freezing" of Farm Workers

The seriousness of the effects of the Tydings amendment, the Farm Labor Act of 1943, and the state emigrant laws was succinctly set forth in a report of a Government agency in mid-1943, when it stated:

"Providing adequate labor for the proposed 1944 and 1945 production program depends first of all on *increasing the mobility of our agricultural workers*. Instead of "freezing" them in their present locations, every effort should be made to insure their rapid, orderly and planful movement from one task and one area of peak demand to another. It is directly contrary to the interests of the war that workers be frozen on farms that are too poor or too small, or which can produce only those crops we have little need for. The prevailing practice of requiring the county agent to approve the transfer of any farm worker out of the county merely assures the continuance of the present poor distribution and use of farm labor, and in fact helps to wipe out the valuable army of migratory farm workers whom we have had in the past. Even worse is the practice, now observed officially by Louisiana, Arkansas, Mississippi, and Missouri, and unofficially by

other states, of prohibiting the recruitment of farm labor for out-of-state use. Unless both federal and state restrictions on the controlled movement of farm labor are removed, any food program that involves either a substantial increase in total output, or a significant shift in emphasis from one crop to another, is impossible without a considerable increase in the total number of farm workers. When the desired results can be achieved by better use of the existing farm labor force, any such increase is indefensible and directly contrary to the interests of the war effort."[27]

Basic Problems of Farm Labor

Probably the two principal factors which underlay the farm labor problem in the early war years were a maldistribution of the farm labor force and a faulty and unbalanced farm wage structure. The extent of the maldistribution of the farm labor force has already been described above.

An examination of the farm wage structure in 1941–1942 indicates the following:

First, there was extreme variation in farm wage rates between the states and regions of the United States. Such variation is symptomatic of the disorganization of the farm labor market. As of October 1, 1942, for example, the daily farm wage rates (without board) were as follows:[28]

United States	$2.76
New England	4.06
Middle Atlantic	3.88
East North Central	3.67
West North Central	4.33
North Atlantic	1.82
East South Central	1.75
West South Central	2.30
Mountain	4.34
Pacific	5.60

With wage rates at less than half of other regions, it is easily understood why the Southern states in particular were interested in "freezing" their workers.

Second, there was a great disparity between the wages of farm

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[27] *Fundamentals of a Wartime Food Program*, Report to the Food Advisory Committee by the Sub-Committee on U. S. Food Allocation Policy, July 1943, p. 29–30.

[28] U. S. Department of Agriculture, Bureau of Agricultural Economics, *Farm Labor*, October 19, 1942.

workers and the wages of common labor in industry. The effect of such disparity was to accelerate a movement from "farm to factory." This was the serious problem, not the drafting of farm workers. Only special deferment considerations would have stopped this movement. As of July 1941 the actual wage rates for both groups of workers were as follows:[29]

	Daily Farm Wage Rates (without Board)	Hourly Entrance Rates for Common Labor
United States	$1.98	$.564
New England	3.22	.571
Middle Atlantic	2.93	.622
East North Central	2.79	.629
West North Central	2.69	.589
South Atlantic	1.40	.424
East South Central	1.16	.429
West South Central	1.55	.398
Mountain	2.82	.573
Pacific	3.33	.689

It is of interest to note that common labor wage rates are not only higher than farm wage rates but also vary less than farm wage rates.

Conclusion

The description of the problem automatically suggests the solution, namely, increased mobility of farm workers. This would have required, first, the elimination of all legal and institutional barriers to movements of farm workers; second, the provision of adequate housing facilities for workers to accompany a large transportation program. The effect of such a program, accompanied by higher farm wage rates would not only have permitted a better utilization of the existing labor force but would have been a tremendous impetus in the improvement of the notoriously low living standards of farm workers.

Finally, one should note the extent to which national and state policies can be established on the basis of propaganda and incorrect information rather than on facts.

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[29] U. S. Department of Agriculture, Bureau of Agricultural Economics, *Farm Labor*, July 11, 1941 and Department of Labor, Bureau of Labor Statistics, *Monthly Labor Review*, January 1942, p. 154.

FARMERS' ASSETS OUTSIDE THEIR BUSINESS*

THE amount and character of the assets of farm people in addition to their operated farms are of considerable importance in appraising the financial position of agriculture. Such assets are closely related to the problem of the financial stability and security of the individual family, as well as to the broader question of the financial relationship of agriculture to the rest of the economy. Farm management studies have supplied considerable data on the strictly farm assets, but the other assets of the family usually have been ignored or lumped together without analysis. This paper is a report on a study directed at this essentially blank spot in the financial structure of agriculture.

The Data

A broad survey of the financial position and practices of Pennsylvania farmers was conducted during the summer of 1947. An effort was made to obtain a true cross section of farmers in the state by distributing the 525 records in 158 area segments in 14 counties. As would be expected, refusals were comparatively high, since the survey was concerned with what are ordinarily considered personal financial matters. Records were not obtained from 23 percent of the farmers in the area segments, although "not at home" and "honestly too busy" accounted for 40 percent of the failures to obtain a record.

In view of the number of refusals, it was encouraging that the estimated average size of farm and average age of the operator were 104 acres and 48 years for those from which a record was not obtained, compared with 135 acres and 48 years for the cooperators. Two other points should be noted regarding the information used in the following analysis: (1) the data are limited to the 399 commercial farmers in the sample by eliminating those who had less than 175 productive man work units and those who worked off the farm 5 months or more during the year and (2) the data are limited to the non-farm asset phase of the survey, which also included detailed information on credit and insurance.

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Ordinarily there is no question as to whether a particular asset should be considered an integral part of the operating unit including the farm home or as being outside the business. In some cases, however, the proper classification was not apparent and a few arbitrary decisions were necessary. For example, none of the cash on hand, in the checking account, or of the accounts receivable was considered as being an outside asset. On the other hand, all stock in farm cooperatives was included among outside investments or assets.

The General Picture

Assets held by 399 commercial farmers in Pennsylvania outside their operating units accounted for 13.6 percent of their total net

TABLE 1. TWO DISTRIBUTIONS OF FARMERS ACCORDING TO AMOUNT OF THEIR ASSETS OUTSIDE THE OPERATED FARM, 399 COMMERCIAL FARMS, PENNSYLVANIA, JUNE, 1947

Amount of outside assets	Number of farmers	Percent of farmers	Percent outside assets are of total net worth	Number of farmers	Percent of farmers
None	46	11.5	None	46	11.5
$ 1–$ 499	128	32.1	1– 4.9	154	38.6
500– 1,499	88	22.0	5– 9.9	61	15.3
1,500– 2,999	47	11.8	10–14.9	43	10.8
3,000– 5,999	28	7.0	15–19.9	24	6.0
6,000– 11,999	38	9.6	20–29.9	33	8.3
12,000 and over	24	6.0	30 and over	38	9.5
Total	399	100.0	Total	399	100.0

worth on June 30, 1947. Almost 9 out of every 10 farmers owned some assets outside their business, although in 44 percent of these cases such outside assets accounted for less than 5 percent of their total net worth (table 1). However, there were 71 cases, or about 18 percent of the total number of farmers, in which non-operated farm assets equaled 20 percent or more of their total net worth.

The types of assets owned by Pennsylvania farmers outside their business are revealed in table 2. The importance of the various types depends on whether judgment is based on the number of dollars or the number of farmers involved. For example, in terms of total value farm real estate was the most important type of asset owned by farmers in addition to their operated farm, comprising

17.3 percent of the total; however, only 8 percent of the farmers owned other farm real estate. On the other hand, 47 percent of them owned government bonds and 60 percent owned reserves in the form of life insurance. Loans to other farmers in the form of mortgages or notes was not an important outlet for farmers' surplus funds, accounting for less than 5 percent of the total.

TABLE 2. KIND AND IMPORTANCE OF ASSETS OWNED BY 399 COMMERCIAL FARMERS OUTSIDE THEIR OPERATED FARMS, PENNSYLVANIA, JUNE, 1947

Kind of asset	Total value of assets	Percent of total value	Percent of farmers owning each asset	Average value for farmers reporting
Other farm real estate	$203,339	17.3	8	$6,162
Government bonds	191,039	16.2	47	1,033
Savings accounts*	178,452	15.1	21	2,099
Life insurance—Operator**	176,966	15.1	60	747
Other real estate	163,618	13.9	11	3,636
Other stock	129,328	11.0	8	4,171
Mortage loans to farmers	30,725	2.7	3	2,793
Life insurance—Other**	27,242	2.3	24	290
Notes to farmers	22,037	1.9	4	1,469
Other loans	21,386	1.9	3	1,782
Cooperative stock	11,474	1.0	25	114
Other bonds	9,580	0.8	1	1,597
Other	10,068	0.8	1	2,517

* Includes Savings and Loan and Building and Loan Associations.
** Cash reserve value of present policies.

As would be expected, in buying real estate there was a strong tendency to stay close to the home farm; approximately one half of the properties were within five miles. Houses and lots were the dominant types of other real estate, accounting for 50 percent of the total properties. A wide variety of other types comprised the remainder.

Outside of bank stocks, which accounted for one fourth of the reported common stock holdings, variety was the rule in selecting this type of investment. One half of the holdings were represented by stocks listed on the major exchanges, but only one issue was reported as often as two times. About one fourth of the total amount of common stock was represented by the holdings of one farmer who had inherited a substantial sum which he had invested in stocks. However, this was the only instance of large security holdings by one individual.

Some Factors Related to the Kind and Amount of Outside Assets

One of the important factors affecting the kind of assets in which farmers invest funds outside their operated farms appears to be the total dollar amount of such assets that they own (table 3). Those farmers with a relatively small amount of outside assets (less than $500) had over half of their total in the cash value of their life insurance, with government bonds second in importance. In sharp contrast with this was the group with large outside investments (over $3,000) where the cash value of life insurance accounted for

TABLE 3. RELATION BETWEEN THE TOTAL AMOUNT OF ASSETS OUTSIDE THE OPERATED FARM AND THE PERCENTAGE DISTRIBUTION OF THOSE ASSETS ACCORDING TO KIND, 399 COMMERCIAL FARMS, PENNSYLVANIA, JUNE, 1947

Value of assets outside the farm	Number of farms	Percent of total assets outside operated farm in:					
		Cash value life insurance of operator and family	Other farm real estate	Other real estate	Government bonds	Savings accounts	Stocks
Less than $500	174	58	1	4	22	6	1
500– 3,000	135	48	9	6	14	13	3
Over 3,000	90	10	19	16	16	16	11
Total or average	399	17	17	14	16	15	11

only 10 percent of the total. In fact, it was only in this group that other farm and city real estate and common stocks comprised an important part of the total. The apparent diversification in the kind of assets owned, suggested by the relatively uniform percentages in each kind of asset, will be considered later.

Certain characteristics of farmers with varying amounts of assets outside the farm business are shown in table 4. This simple sorting of the data indicates that those farmers with the smallest amount of assets outside the business tended to be younger men with smaller businesses and with much smaller net worths than were the farmers with a large amount of outside assets. Almost one fourth of the farmers with over $3,000 in outside assets inherited $5,000 or more, but in all three groups the total amount of inheritance was relatively small when expressed as a percentage of current net worth.[1]

[1] These data on inheritance do not cover all types of parental assistance nor have they been adjusted to the current price level which was the basis used in determining net worth.

Furthermore, less than 10 percent of the current assets in real estate outside the operated farm were inherited, although almost 40 percent of the assets in stocks were acquired in this way. As would be expected, those farmers with important assets outside the business had smaller indebtedness on the average than did the other groups. Formal education and number of children did not seem to be associated with the amount of outside assets.

TABLE 4. ASSOCIATION OF AMOUNT OF ASSETS OUTSIDE THE OPERATED FARM WITH CERTAIN CHARACTERISTICS OF THE OPERATOR AND HIS FARM, 399 COMMERCIAL FARMS, PENNSYLVANIA, JUNE, 1947

Item	Amount of assets outside operated farm			All farms
	Less $500	$500–$3,000	Over $3,000	
Number of farmers	174	135	90	399
Median assets outside farm	133	1,156	9,078	612
Median total net worth	9,802	17,117	35,190	15,742
Average size farm (PMWU)	398	430	521	436
Percent inheriting $5,000*	6	7	24	10
Inheritance as percent of net worth	5	6	8	7
Average indebtedness	1,599	1,201	987	1,326
Percent owing $100 or more	58	44	28	44
Percent owners and part owners	73	82	90	80
Average age of operator	44	48	52	47
Average school grade completed	8.7	8.9	9.5	9.0
Average number of children	3.1	2.7	3.1	3.0

* Any inheritance by the farmer's wife was included in determining the total amount of inheritance.

The preceding analysis of the association of certain factors with the amount of assets outside the farm was refined somewhat by dividing the farmers with more than $24,000 net worth into two sub-groups on the basis of whether more or less than 8 percent of their total net worth was represented by assets outside the business. The most interesting feature of this particular analysis was the fact that while it was intended to deal with a homogeneous net worth group, sub-sorting on the basis of the percentage of total assets outside the business resulted in an average net worth of $34,400 for the 51 farms with less than 8 percent of their total net worth in outside assets, compared with an average net worth of $41,200 for the 66 farms with a larger proportion of outside assets. In other words, the analysis keeps pointing to the logical and dominating importance of total net worth in explaining differences in the

amount of assets outside the business with other factors playing a secondary role. This relationship is shown more clearly in table 5.

This table suggests that the relative importance of assets outside the business to total net worth may be divided roughly into three levels or groups. In the first group comprising those farmers with less than $12,000 net worth, the amount of assets outside the business was relatively small. In the second group, with net worths

TABLE 5. RELATION OF TOTAL NET WORTH TO THE AMOUNT OF ASSETS OUTSIDE THE BUSINESS, SIZE OF BUSINESS, AND AGE OF OPERATOR, 399 COMMERCIAL FARMS, PENNSYLVANIA, JUNE, 1947

Total net worth	Number of farms	Average size (PMWU)	Average age of operator	Average net worth	Average assets outside business	Non-business assets as percent of total net worth
Less than $ 5,999	48	314	36.8	$3,678	$317	8.6
$ 6,000– 11,999	101	352	43.8	8,956	510	5.7
12,000– 17,999	75	347	47.6	14,703	1,855	12.6
18,000– 23,999	58	439	49.4	20,933	2,146	10.2
24,000– 35,999	53	577	51.2	28,717	3,298	11.5
36,000– 47,999	28	588	52.2	41,305	6,551	15.9
48,000 and over	36	684	53.9	70,402	13,518	19.2
Total or average	399	436	47.1	$21,581	$2,945	13.6

of between $12,000 and $36,000, the proportion was somewhat larger but did not change appreciably within this range. In the third group beyond $36,000 there was a tendency for the proportion of non-business assets to increase. Up to this group, size of business had tended to increase in line with total net worth, but at this level expansion of the operating unit did not keep pace with the increase in total net worth.

An Appraisal of the Assets Outside the Operated Farm

One of the first tests ordinarily applied to a financial program is that of diversification among several types of assets. The fact that the operated farm ordinarily comprises such a large part of total net worth and that farm income is highly variable would seem to make it particularly important for farm people to consider diversification in investing funds outside their business.

In this connection the following facts on diversification by the 90 farmers with over $3,000 in assets outside their business are significant. In 78 percent of the cases, over one half of the individual's total outside assets was accounted for by his largest investment.

In 40 percent of the cases over three fourths of the total was accounted for by the largest investment. The tendency toward concentration was greatest when the largest investment was in real estate, and least when the largest amount was in government bonds, savings accounts or loans to other farmers.

TABLE 6. RELATIVE IMPORTANCE OF REAL ESTATE AND STOCKS COMBINED IN THE ASSETS OWNED BY COMMERCIAL FARMERS IN PENNSYLVANIA, OUTSIDE THEIR OPERATED FARM, JUNE, 1947

Amount of outside assets	Average percent in real estate and stocks	Percent of farmers with over 50 and 75 percent of their total outside assets in real estate and stocks	
		Over 50 percent	Over 75 percent
Less than $ 500	5.4	2.3	1.7
$ 500– 3,000	17.2	14.8	10.4
3,000– 7,000	30.0	29.4	17.6
Over $7,000	48.5	46.4	30.4

An alternative and perhaps more significant approach would be to consider the diversification problem from the standpoint of the farmer's total assets including his farm. Viewed in this light a concentration of funds outside the business in government bonds could hardly be criticized. Since the value of the operated farm is geared closely to the general price level, the individual's assets outside the business were rated on their general sensitiveness to fluctuations in the economy. Non-operated farm real estate, other real estate, and common stocks were grouped together as being sensitive to general fluctuations and hence not ordinarily a good means of spreading the risks inherent in the value of the operated farm. The relative importance of these sensitive assets is indicated in table 6.

These data indicate clearly that many farmers who had a significant amount of assets outside the business had their assets in investments with an unstable monetary value. Thus, even though the value of such non-business assets might be substantial, they would often fail to contribute effectively to the economic stability of the family. The quality of the sensitive assets would affect the degree of risk in individual cases but it is questionable whether the average quality would be sufficiently high to materially alter the basic instability of this type of asset during a general deflationary period.

In the case of sensitive assets, timing and selection are of great importance if the capital value is to be maintained or increased. The degree of success of the farm operators in this respect can hardly be judged at this point. A tabulation of the time of purchasing sensitive assets showed that 34 percent of the total number of such assets and 40 percent of total current value were acquired after 1944. In 57 percent of these cases the value in June 1947 exceeded the cost. The analysis by type of asset did not reveal any major differences among them with respect to timing or apparent success as judged by current value in relation to cost. In other words, the continuing inflation had kept actual losses to a minimum up to the time of the survey, with the final success of these commitments depending on the future course of prices and disposition of the property.

Investment Intentions

Up to this point all information has pertained to the assets owned at the time of the survey. The cooperating farmers also were asked the question, "If you were going to invest additional money outside the farm business, where would you invest it?" Although the persons surveyed did not think of outside investments in as broad terms as those used in this paper, the answers to this question are enlightening. Government bonds were the first choice of 32 percent of the 284 farmers who gave definite answers. Other farm real estate was the first choice of 22 percent, followed closely by nonfarm real estate with 19 percent. In other words, 41 percent of the farmers would select real estate for any additional investment outside their business, even though real estate now constitutes their principal asset. Stocks and bonds were chosen by 8 percent of those farmers answering the question. The reasons given for their investment choices are shown in table 7.

It is significant that many farmers appeared to appreciate the difference in the safety of their principal when they choose real estate and securities instead of government bonds for their outside investments. As would be expected, familiarity with farm real estate was one of the important reasons for selecting it as the medium for further investments outside the business. Somewhat surprising was the relative importance of "high return" as a reason for selecting other real estate and securities, or perhaps it is another example of "greener pastures."

Analysis of the answers on the basis of the present amount of assets outside the business and on the basis of the nature of the largest investment at present indicated that these two factors were not particularly important in indicating investment choice. One factor which seemed to be associated to a significant extent with the present amount of outside assets was the number who did not answer the question. The "no choice" answer occurred in 36 percent of the cases where the total outside assets were less than $500,

TABLE 7. PERCENTAGE DISTRIBUTION OF THE MAJOR REASONS FOR SELECTING THE INDICATED MEDIUM FOR INVESTING FUNDS OUTSIDE THE FARM BUSINESS, COMMERCIAL FARMERS, PENNSYLVANIA, JUNE, 1947

Investment choice	Number of farmers	Percent giving following reasons:		
		Security	High return	Familiarity
Government bonds	91	95	5	—
Farm real estate	63	43	6	24
Other real estate	54	48	22	2
Securities	24	22	48	—

while only 16 percent of those with over $3,000 in outside assets failed to indicate their investment choice.

The nature of farmers' present investments was related in some cases to their choice for further investments outside the business. For example, in those cases where government bonds comprised the largest item in their present outside assets, government bonds were also the most common choice for further investments. However, government bonds were the choice for slightly less than one half of those now emphasizing government bonds in their outside assets.

There was also a tendency for farmers whose largest investment was real estate, including both farm and non-farm, to indicate some type of real estate as their investment choice. However, almost one half of those with real estate as the dominant asset indicated some other choice for investing additional funds.

Summary and Implications

This survey conducted in the summer of 1947 reveals that Pennsylvania farmers had important assets outside their operated farms. In almost 60 percent of the cases such assets exceeded $500 and in 15 percent they exceeded $6,000. On the basis of value, other

farm real estate was the most important type of asset, followed closely by government bonds, savings accounts, cash reserves in life insurance, and other real estate. In those cases where the total amount of outside assets was comparatively low, government bonds and cash reserves in life insurance were important, while real estate and securities were more important in the case of those farmers with large amounts of outside assets.

The actual amount of the assets outside the business appeared to depend more on the total net worth of the operator than on any other factor. After total net worth reached a high level, size of business did not increase proportionately so that a larger percentage of the total net worth was in assets outside the business. Inheritance was not a major factor in explaining the amount of assets outside the business except in a few cases.

The greatest weakness in this picture of financial assets outside the operated business was the lack of diversification. Not only did one type of asset commonly represent a large part of the total, but more importantly, a considerable amount was represented by assets which would tend to fluctuate in value in line with the value of the farm business. Thus, in many cases where the outside assets were large they would fail to add effectively to the financial stability of the family during a deflationary period. This inclination to select sensitive as contrasted with protective assets was also revealed by the operators' answers to the hypothetical question of where they would invest additional funds outside the business. Almost one half of those designating a choice indicated a preference for real estate and securities.

By revealing the relative importance of farmers' assets outside their business, together with some of the problems associated with such investments, this study focuses attention on the broader problem of the alternative uses of farmers' savings.

In the writer's opinion this is a problem area of greater importance than is indicated by the amount of resources being devoted to it at either the research or extension level. While it is unfair to say that the problem has been ignored, particularly in Extension, it is true that the concept of the many available alternatives has seldom been adequately developed or presented. In other words, our approach has tended to be piecemeal rather than comprehensive, in a manner somewhat reminiscent of our earliest educational

efforts to improve farm efficiency by emphasizing individual enterprises without regard as to how such enterprises should be integrated into a balanced farming system.

There is real need for research and extension support of a comprehensive program in financial planning analogous to the balanced farming programs now under way in a number of states.[2] Such efforts should enhance the family's satisfaction from their expenditures and increase their economic security through a more balanced investment program. It should also have some moderating effect on the demand for land in prosperous times by developing an understanding of and appreciation for alternative uses of disposable farm income.

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DISCUSSION: "A NEW SYSTEM OF FARM ACCOUNTING"

IN THE recent issue of the JOURNAL OF FARM ECONOMICS (August, 1948) there appeared an article by A. L. Jolly worthy of the attention of farm accountants and managers. Mr. Jolly in "A New System of Farm Accounting" outlined a system of double entry accounting on statistical cards that he has devised, and that he asserts is a considerable improvement over the conventional "double-entry" system.

The subject is worthy of discussion. I trust that the recent article and the following comments may bring forth additional treatises in the future.

1. In the first place, everyone should recognize that farm accounting is not a goal in itself—it is a means of attaining a number of worthy objectives. Any attempts to lessen and lighten the work involved are worthwhile, and Mr. Jolly is to be commended for his endeavors.

2. Mr. Jolly is right in asserting that there is largely a tendency to stress only an analysis of the farm business as the objective for

[2] See Federal Extension Service Circular 422, January, 1945, "Farm and Home Financial Planning," by Z. L. Galloway and Mary A. Rokahr for a good discussion of the considerations and procedures for over-all financial planning.

farm bookkeeping. Recently the objective of facilitating the preparation of income tax reports has been emphasized. But other objectives that call for accounting of "all" the family affairs are insufficiently stressed.

3. Mr. Jolly seems to give the impression that only double-entry or "orthodox" accounting will suffice for "all accounting." However, there are several so-called single-entry farm account books prepared by University farm management specialists that are designed to enable the farm family to account for all of its affairs.

4. Mr. Jolly indicates that double-entry bookkeeping facilitates checking back to cash and credit purchases and sales. This is certainly one of the advantages of double-entry bookeeping. But there are a number of advantages and disadvantages of both systems. Experiences have shown that both systems have their place and proper adaptations.

5. The proposed system outlined by Mr. Jolly is designed only for the double-entry accounting. Now it is possible to develop a similar system for single-entry accounting. Supplemental cards or sheets are used by farmers for hanging near roadside markets, feed and fertilizer storage spaces, milking parlors, etc. Many farmers obtain itemized statements from stores. Carbon copies of checks could be arranged for, as Mr. Jolly suggests. Some banks aid farmers in the preparation of income tax reports by sorting their returned checks by enterprises and showing sub-totals on their bank statements.

In fact, for the single-entry system no provision would need to be made for sorting and resorting the cards. Carbon copies could be made of cards carrying the entries of inside transfers of value within the farm business. All cards could be placed in separate compartments in manila folders or filing cases, each compartment designed for separate enterprises or items for which sub-totals are desired in financial, business analysis, or income tax statements.

6. Mr. Jolly stresses the savings in time and work that his card system would permit as compared with the conventional double-entry system. It is not clear as to what he means by the latter. If he is referring to the old-style two-column Journal with all items posted to a Ledger, there is very little question concerning his assertions. But modern methods of double-entry accounting have themselves provided for decided savings in time and work. Among other things these methods include multiple-column Journals and

numerous supplemental forms or "cards" kept close to the sources of data or various farm operations for the accumulation of weekly, monthly or quarterly totals.

7. Mr. Jolly indicated that the cost of equipment necessary for using his card system in farm accounting is negligible—less than three dollars. This does not include the cost of the cards, nor of cabinets or other means for filing and storing the vast amount of cards that would accumulate in a few years. Nor does it include the cost of an adding machine, which is a considerable amount.

Farm account books, journals and ledgers can be totaled, if necessary, without the use of adding machines. But it would be rather difficult to dovetail a large number of cards so that they could be totaled by the eye. On account of the space occupied by the perforations and accompanying numbers, the values must be set back from the border considerably, as illustrated in Figure 6 of the Journal article.

8. Even with the use of an adding machine, the turning over of cards slows up the process of additions somewhat.

9. As a rule, proficient farm managers need to scrutinize the situation in connection with each enterprise occasionally if not frequently. With the conventional system multiple columns may be used for such items as cash, bank account, egg sales, milk sales, wages paid, etc. for which there are numerous transactions. The sub-totals may be posted at certain intervals. Entries for purchases, sales, etc. of livestock, tobacco, grain, etc. may be entered in general columns in the Journal and posted individually to the Ledger. Then the manager can readily scrutinize the various accounts in the Ledger at any time, and quickly grasp the situation.

With the proposed card system each scrutiny would call for a resorting of the cards, a totaling of the amounts thereon, and spreading them out to observe relations of parts to the whole.

10. One wonders whether Mr. Jolly hasn't over-looked the situations in which a card system could be used to real advantage. On a few large farms the volume of transactions and profits are sufficient to justify the additional investment necessary to use a punch card system, with the use of machines that both sort and produce totals and sub-totals. Some of these farms are adjuncts to other businesses such as canneries, dairy processing plants, etc. which could share part of the costs of the accounting equipment. Others are sufficiently large to warrant the expense solely for the farm business.

It is conceivable that substantial savings of time, work, and clerical expense could be made by the use of the card system with punch cards in these large farm businesses. But for the great majority of our farms there is a possibility that the extra time involved in sorting and re-sorting with needle and clipped cards, and in adding from cards for current observations and determinations of results, would approximately equal any savings involved in making Journal entries and posting to a Ledger. This is especially true in reference to comparing the card system with the use of forms for accumulating routine data close to the locations of operations in conjunction with well planned multiple-column journals.

11. Among other advantages claimed or apparently inferred by Mr. Jolly for his card system as compared with conventional double-entry bookkeeping are the following:

(1) The entering and checking of transactions is facilitated by his card system.

(2) The card clippings enforce decisions, the accumulation of which "results in more precise distinction being made in the classification of transactions."

(3) His system facilitates detection of wastage and unbusinesslike methods, and the encouragement of better control of operations and management procedures.

(4) His system requires less clerical skill.

The inference that these four advantages, as well as others stated above, may be definitely claimed for his card system is undoubtedly subject to challenge. Of course that is a matter of personal opinion, which might be changed with considerable experience in using the system. Although the explanations of principles and the illustrations seemed quite clear, this writer may have misunderstood some parts of Mr. Jolly's article, and, if so, will appreciate having any apparent misinterpretations corrected.

Undoubtedly many farm accountants and farm management specialists would appreciate knowing the opinions and, preferably, experiences of other workers who have used some of these systems of accounting or modifications thereof.

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RESULTS OF TWO SAMPLING METHODS USED IN FARM MANAGEMENT RESEARCH

A REVIEW of developments in sampling farms as reported in the JOURNAL OF FARM ECONOMICS and in the *Journal of the American Statistical Association* in the last few years indicates that work in this field has been generally concentrated on samples that are larger and spread over wider and more diverse areas than samples more commonly used in research in farm management. Yet principles developed carry very definite implications for small samples for use in farm management studies within limited areas where efficiency and precision are essential to most satisfactory results.

Efficiency per schedule has been shown to vary inversely with size of blocks used as sampling units. Geographic stratification as a means of controlling random sampling variation usually increases precision of a sample, with the smaller strata giving more effective control. Area sampling makes the use of definite sampling rates possible because the number of units in the area to be covered is known. Possibilities for use of aerial photographs for increasing accuracy have been recognized.

Questions on which the writer has been able to find less definite suggestions include the influence of variation in size of blocks included in a sample, as in a method where the number of farms within a block is determined by the number of farm headquarters found within the boundaries of the block. Another question on which little information was found is the suitability of various items and measures used in estimates of reliability of a sample. This question arises from the fact that relative efficiencies of two designs, as indicated by a comparison of variances for samples, vary with the items used for the comparison.

Differences between two small samples drawn from an area in Mississippi give an indication of sampling errors and decreased efficiencies that may be associated with size of block, variation in number of farms per block, and items used for comparison, although the sample having wide variation in number of farms per block was not large enough to permit a separation of the influence of this item from that of size of blocks.

One of the samples used in the comparison was developed through

a procedure that seems to be in accord with suggestions from results of recent developments in sampling, when the objectives of sampling include determining approximate distributions or means for farms in an area. It makes use of the most accurate and complete information available as to number and location of farms in the area studied, and illustrates a means by which most of the advantages of using individual farms as sampling units can be combined with advantages of area sampling. This sample is drawn from aerial photographs in the county office of the Production and Marketing Administration. The other method is one which is in common use in various parts of the country since development of the materials from whilh the Master Sample of Agriculture was drawn, and which in this area includes blocks or segments with a rather wide variation in numbers of farms.[1]

The Two Methods of Sampling

Development of the farm classification and analysis project in the test-demonstration program of Mississippi State College and the Tennessee Valley Authority made it desirable to use the best sampling method available to obtain information on the approximate distribution of farms and characteristics of farms in the different classes or major situations. In this project, analysis of groups of farms found in such a cross-section sample of an area is designed to facilitate location of test-demonstration farms within the different major situations in the area and development of farming systems adapted to resources of these farms. For these reasons, measures for determining distributions and describing characteristics also had to be adapted and developed.

Possibilities for additional farm development on nonfarm land were to be explored. This was an additional encouragement toward use of some form of area sampling.

Area sampling as used to select the Master Sample[2] was recom-

[1] Acknowledgment is made to Mr. Earl Houseman of the Bureau of Agricultural Economics for constructive criticism of alternative sampling methods considered in developing the method used in drawing the sample for which this comparison is made with one from the material used in drawing the Master Sample of Agriculture, for suggesting statistical procedures suitable for the comparison, and for a most helpful review of the manuscript. Acknowledgment is also made to Mr. Emil H. Jebe of the Institute of Statistics, North Carolina State College, for a very helpful review of the manuscript. The author, of course, assumes all responsibility for statements made.

[2] "The Master Sample Project and Its Use in Agricultural Economics," by R. J. Jessen, this JOURNAL, Vol. 29, No. 2. May 1947.

mended by our statistical consultants for use in sampling both farms and nonfarm land. The sample referred to in this statement as the "cluster sample" was selected from the Master Sample maps, the sampling units being small blocks or areas called "segments," which have identifiable boundaries and in so far as possible the same number of farms (census definition). The base maps used to develop the Master Sample maps are county highway maps which indicate the location of houses and were published in 1939. The size of the segments ranged from about 4 or 5 indicated houses to about 10 or 12. The topographical features of the area under study, inaccuracy of the highway maps as to location of houses in 1947, and the fact that nearly one-half of the families living out in the country are other than farm operator families made considerable variation in number of farms from segment to segment unavoidable.

The other sample used in the comparison, referred to in this statement as the "farm sample," was drawn from Production and Marketing Administration aerial photographs by using as sampling units or segments individual farms plus the farm's pro rata part of any adjacent nonfarm land, thus giving complete area coverage of farms and non-farm rural lands the same as in the cluster sample.

The method of selecting the farm sample can possibly be set out most simply by comparison with the method used in selecting a sample from Master Sample materials, assuming that the reader has at least a general idea of how such a sample is selected. The same procedure was used for selecting the farm sample as for the cluster sample except for adjustments indicated in the column headings of the following tabulation form, in which the column headings for the farm sample are in parentheses:

1	2	3	4	5	6	(7)
Minor civil division number	Count unit number	Number sampling units—segments in count unit	Cumulative sampling units—segments	Count unit selected	Segment number	
(Flight tier number)	(Photograph number)	(Number farms on photograph)	(Cumulative number farms)	(Photograph selected and farm number drawn)	(Name of farm operator)	

In drawing the farm sample, following systematically through all the photographs as they were made by flights, as columns 1, 2, and 3 were filled and the figures from column 3 cumulated in column 4, a random number between one and 40, the number indicated by

the sampling ratio, was selected. The number drawn marked the first farm selected, the one that served as the beginning point for taking every fortieth farm down through the cumulative totals in column 4.

One column (7) for acres of nonfarm land was added to the tabulation form for use in the farm sample, and the approximate acreage of such land was entered from the photograph for each segment selected and containing nonfarm land. This figure was obtained by measurement of the area included when the boundary lines of each selected farm adjacent to nonfarm rural land[3] were extended into the nonfarm land area to the points where they would meet similar extensions from other farms bordering the nonfarm land when all of the nonfarm land was considered to be prorated to adjacent farms on the basis of frontage of the farms on the nonfarm land. Boundary lines of the farm sample segments, with farm lines solid and nonfarm lines dotted, were transferred to county soils maps which showed section lines, roads, streams, and houses the same as on county highway maps.

The Northeastern Highland Area

The general soils and type-of-farming area from which the samples were drawn is commonly referred to as the Northeastern Highland Area. It is in the three Tennessee Valley counties of Mississippi, and is an area of hills and narrow valleys containing a little over one-half million acres, with about four-fifths of the land in farms and less than one-half of the farm land cleared.

Rural resident families in the area, that is, farm families and other families living out in the country, are distributed in the approximate ratio of 7, 3, 2, 1 among farm operator families, other families farming, still other "census farm" families (also meeting the United States Census definition of farm operator families), and other families, respectively.[4]

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[3] Nonfarm land use for residences and business purposes inside towns and villages was omitted from acreages recorded as nonfarm rural land in both samples, because the areas of special interest in the survey were farm lands and land that might be or become farm woodland, cropland, or pasture.

[4] Farm operator families are families who are operating and managing their farms independently of other farm operators. About 30 percent of the farm operators in this area have one or more other families farming with them. These "other families farming" are nearly all share renters ($\frac{1}{3}$ and $\frac{1}{4}$ share) and croppers ($\frac{1}{2}$ share). About 75 percent of the farm operators are owners, the remainder being almost entirely share renters, with only an occasional cropper or cash renter among them. Families

Quality and use-suitability of the sandy Upper Coastal Plain soils of the area are closely associated with elevation and topography.

Size of farms in this area is influenced by kind of soils much the same as is land use and size of fields. Farms using mainly the poorer, drier, more rugged soils for crops have less than one-half as many acres of cropland as those using mainly the better soils for crops. They have about the same number of cropland fields and use about two-thirds as much labor as farms on the better soils. The acreage remaining in woodland is about the same per farm in these two soils situations. The distribution of farms within these soils situations by acres of open land (cropland plus open pasture) shows that farms using mostly the poorer, more rugged soils tend to be small and that those on the deeper, more moist soils tend to be relatively large.[5] Multiple family farms are, as is true for farms on which tractors are used, generally the larger farms with higher proportions of cropland on the better, deeper, more moist soils.

Cotton, corn, and small acreages of hay are the principal crops of

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referred to as "still other census farm families" are ones who are really not farming but yet live out in the country and have a garden, chickens, and a cow, or otherwise meet the census definition of producing $250 worth of farm products or having three acres of land on which some farm products are produced. In the survey for which this report is made a farm includes all land farmed under one operator.

[5] The comparison is made between farms having one-third or less of their cropland on the deeper, more moist soils and those having two-thirds or more of their cropland on those soils, based on a cross-section survey of the entire area. The division between the two general groups of soils found on farms was made by combining soil types and phases into groups having similar suitable uses and management requirements and which were found in similar geographic positions, arranging these use-management groups in order to fit the land-use pattern of the area, and then determining what appeared to be the most significant point at which a break in the scale could be made for grouping cropland.

The soils-grouping of farms is based on the land-use pattern and the association of sections of the pattern with kind of soils used for cropland which on farms in this area is nearly all of the best open land. The association is a natural one based on the location of soils. The land-use pattern of the area, formed by uses to which farmers tend to put the different kinds of soils, is as follows: Lowest wettest land, permanent woodland, hardwood; next wettest, permanent pasture; slightly better drained soils, hay; still better drained soils but not dry enough for good cotton land, corn; well drained soils including especially the dry sandy hillsides, cotton; steeper and more eroded hillsides and other poor and rugged soils, permanent woodland, pine and mixed pine and hardwood. In terms of use-management groups of soils and even within soil types there is a considerable overlapping of "corn" and "cotton" land. In terms of the association of these groups with elevation and slope, the division between the two general groups used in obtaining the measure of kind of soils used for crops was made at the upper end of the range for soils that are commonly good "corn" land. The measure referred to in this statement as the "soil ratio" was obtained by finding the ratio of the acres of cropland on the lower, deeper, more moist soils to the total acres of cropland.

the area, with relatively larger acreages of corn and hay being grown on the deeper, more moist soils, and relatively larger acreages of cotton on farms having a higher proportion of their cropland on the poorer, drier soils. Lespedeza is the principal hay crop on farms having higher proportions of the deeper, more moist cropland soils, while soybeans provide the smaller amounts of hay grown on the poorer, drier soils.

Farms in the most rugged, most severely eroded areas are being abandoned to pine timber production, while further concentration and expansion are the rule in the lower, wetter areas.

Tishomingo County, entirely within the area and making up approximately one-half of it, was used for the test of sampling methods. It is slightly more rugged than parts of the area extending into adjoining counties. The county has been measured, by acres of different soils in the Soil Survey, and photographed, with farm boundaries for both cooperator and non-cooperator farms marked on the photographs by the USDA Production and Marketing Administration. Approximately 30 percent of the total land of the country, 40 percent of the farm land, one-half of all cleared land, and 60 percent of the cropland is on the deeper, more moist soils.[6]

The Cluster Sample Vs the Farm Sample

Sampling ratios of 1:30 for the cluster sample and 1:40 for the farm sample, totalling about six percent for the combined sample, were used in Tishomingo County for the comparison made to determine the sampling method to be used in the remainder of the area and in other similar areas into which the Farm Classification and Analysis studies are to be extended.[7]

Each method yielded 47 farms, with 55 families farming in the cluster sample and 64 families farming in the farm sample. The total number of "census farms" was larger for the farm sample, but the total number of families, including rural residents not even meeting the census definition of farm operators was larger for the cluster sample. The cluster sample was composed of 14 segments

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[6] See footnote 5 for basis and significance of this grouping of soils.

[7] Plans at the beginning of the survey were to continue use of both sampling methods through the entire Northeastern Highland Area. But field observations and preliminary summaries of the two samples in Tishomingo County indicated that further data for a conclusive comparison for this area should not be needed and that a better sample could be obtained by use of only the one better method for the remainder of the area.

varying in number of farms from none to seven and in number of "census farms" from one to eleven. The farm sample was composed of 58 segments. Forty-seven contained one farm each, five contained areas each of which had been a farm in past years but was not farmed in 1947, three contained only farm land operated as parts of other farms, and three contained only "census farms." The acreage of nonfarm land obtained in the cluster sample indicated only about one-half as much nonfarm land as is indicated by other most reliable figures, while the farm sample appeared to be a little too high on nonfarm land.

Testing the two samples by the common practice of comparing variances for such items as size of farm and acres of various crops was somewhat inconclusive. Two examples will illustrate the point. Acreage of cropland per farm was represented in the cluster sample by 27.5 with an estimated σ^2 of 6.4, while the corresponding figures for the farm sample were 37.4 and 13.5. Acreage of hay per farm was represented in the cluster sample by 2.1 with an estimated σ^2 of .29, and in the farm sample by 3.1 with an estimated σ^2 of .14.[8] The wide differences in means between the two samples suggested that one might be much more accurate than the other, but the variance for acres of cropland was relatively lower in the cluster sample while that for acres of hay was relatively lower in the farm sample.

In the cluster sample, a relatively smaller number of farms, smaller acreages, fewer families farming, lower proportion of the cropland cropped, and a larger acreage of open waste land indicated clearly that the soils on farms in this sample were of a lower quality than those in the farm sample. Comparison of numbers of farms and acres of cropland in each of the samples with Production and Marketing Administration records indicated that figures for farms in the farm sample were much more accurate. Comparisons of acreages and kinds of soils with figures from the

[8] Pearson's approximation for the variance of a ratio:

$$\frac{1}{n}\frac{\bar{x}^2}{\bar{y}^2}\left[\frac{\sigma_x^2}{\bar{x}^2}+\frac{\sigma_y^2}{\bar{y}^2}-\frac{2r\sigma_x\sigma_y}{\bar{x}\bar{y}}\right]$$

There n = number segments in the sample
x = segment total for acres cropland
y = number farms in segment
r = coefficient of correlation between x and y
All figures presented for σ^2 in this statement have been adjusted for difference in sampling ratios to make them comparable for the samples.

Soils Survey of Tishomingo County and with figures for the entire area from the survey of which these two samples are a part gave the same indication.[9]

Analysis of the data from the entire survey having indicated kind of soils as having a major influence in determining size of farm, crop yields, land use, labor used, and other major items in this area, a comparison of the two samples was made for the proportion of cropland on the deeper, more moist soils.[10]

The soil ratio on a percentage basis was represented in the cluster sample by a farm mean of 49 with an estimated σ^2 of 52, indicating a relative efficiency of .27 for this method for sampling kind of soils used as cropland when compared with a farm mean of 56 with an estimated σ^2 of 14 for the farm sample. Soil ratios for total cropland were 53 and 62 for the cluster sample and the farm sample with variances of 833 and 911, respectively, indicating a relative efficiency of 109 for cluster sample segments (3.36 farms per segment) in comparison with farm sample segments (.81 farms per segment). Variances of soil ratios for segments were 60 for the cluster sample (14 segments) and 16 for the farm sample (58 segments).[11]

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[9] "The Production and Marketing Administration has measured 50,678 acres of cropland in 1482 (about two-thirds) of the segments from which the farm sample was drawn. The cluster sample included 1292 acres as one-thirtieth of the cropland, while the farm sample included 1766 acres as one-fortieth of it.

In the most recent soil survey of Tishomingo County, in 1935, 109,000 acres of cleared land were listed. No distinction was made between farm and nonfarm land, but practically all of the nonfarm land is woodland. Total acreages of cleared farm land as estimated from the cluster sample and the farm sample by multiplying sample totals by 30 and 40, respectively, were 62,000 acres and 104,000 acres for the cluster sample and the farm sample, respectively.

Acres of cropland per farm for the entire survey, including 60 schedules from slightly less rugged parts of the area extending into adjoining counties, was 39.5 acres, only slightly higher than the 37.4 for the farm sample but considerably higher than the 27.5 for the cluster sample."

[10] See footnote 5 for explanation of grouping farms in this area by kind of soils used as cropland and determining the soil ratio for each farm.

[11] The variance of $\frac{EX}{EY} = \frac{E(p-\bar{p})^2}{n-1} = \frac{Ep^2-(Ep/n)^2}{n-1}$

Where x = segment total for acres of cropland on the deeper, more moist soils
y = segment total for acres of cropland
p = the proportion for each sample segment

The variance of

$$\frac{x}{y} = \frac{\sigma^2}{n}$$

In non-statistical terms and recognizing opportunity for a considerable range of error in samples containing only 14 and 58 independent observations, this comparison indicates that for sampling the combination of soils used for crops, the most dominating single factor found in a farm management analysis of the data obtained, more than three times as many farm schedules would be required for obtaining an equally good sample by the cluster sample technique as by that used in obtaining the farm sample. On the basis of segments, considering total cropland on farms in each segment without regard to number of farms, only about a 10 percent larger number of segments would be required for the small farm sample segments than for the larger cluster sample segments containing about four times as many farms per segment.

Relative Costs and Efficiency

Relative costs per schedule for enumeration by different sampling methods have been shown to vary with length of schedule, cost of transportation, and a number of other items.[12] The schedule used in the survey upon which this statement is based required as much as 90 minutes for some of the farms. Transportation costs were five cents per mile.

Total enumeration costs per schedule in the two samples were about the same for all items except transportation and drawing the sample. Transportation costs per schedule were about one-third greater for the farm sample, while three and one-half days were required by a clerk in the County Production and Marketing Administration office for drawing the farm sample as compared to only a few hours in Washington, D. C., for the cluster sample. But total cost per schedule for drawing the farm sample plus one-third of the transportation cost per schedule for the cluster sample was less than 20 percent of the total costs per schedule.

The explanation of similar rates of enumeration for the two samples is in operational aspects of the two methods, based on the amount and form of information in the hands of the enumerator before he went to the field. In the farm sample, the usual situation

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[12] "Statistical Investigation of a Sample Survey for Obtaining Farm Facts," by R. J. Jessen, Iowa Research Bulletin 304, pp. 48–53.
"The Theory of Sampling," by W. A. Hendricks and others, Bureau of Agricultural Economics and North Carolina State College of Agriculture and Engineering Department of Experimental Statistics mimeographed report, p. 84.

was that the enumerator not only had the name of the operator but that he had recorded on a soils map the exact location of the farm, with the segment boundaries on property lines except for definite areas of nonfarm land specifically located with reference to the property lines of the farm. In the cluster sample the enumerator had located on a similar soils map much larger segments whose boundaries were roads, streams, and other lines that often crossed farm boundaries in this area or irregular topography. Additional time required for travel between farms in the farm sample was offset in the cluster sample by time required in locating farms, determining which families inside the segment were farm operators, and otherwise making sure that all families and all nonfarm land were accounted for.

In considering costs as they may influence choice of a sampling method for use in farm management research, it should be recognized that enumerators are usually staff members and other technically trained personnel and that editing, tabulation, and analysis may involve costs per schedule as great as those of enumeration. In the farm management field, therefore, a more efficient sampling method might still be the one to use if only financial considerations were involved and if enumeration could be done at as low cost per unit of useful information by the less efficient method. Total costs might still be much lower for the more efficient method when the number of schedules is varied to give equally good samples by the two methods.

Conclusions

The samples used in this comparison were small. This is especially true for the one containing only 14 segments and which evidently accounted for the major part of the differences between the two samples by failure to include a representative sample of soils used on farms and therefore of other items associated with kind of soils. Other similarly drawn samples might, as would be expected for larger samples in this area or for samples of similar sizes in other more uniform farming areas, show smaller differences. The area from which these samples were drawn is, no doubt, an extreme situation for sampling farms. However, it may also be observed, extreme cases sometimes illustrate a point most clearly. Therefore, certain observations and suggestions from this comparison and analysis of data from the entire survey may well be set out.

The usefulness of variance for certain items as an indicator of reliability of a small sample of farms, and therefore as an indicator of relative efficiency, may vary with error in the sample and the influence of the error on the item being measured. This is illustrated by a higher degree of uniformity in acres of cropland and number of families farming on farms below average in quality of soils in the area for which this comparison was made. In a comparison of two samples, the use of an item representing an important influence in determining other items on farms may not only show greater variation than other items that are in varying degrees associated with it but may help to explain any errors in the other items or even to indicate them if the influence of the item is known for the area sampled.

Results of this comparison have indicated that the cluster sample may have included a relatively better sample of all families than of farms, and that the land used as cropland on farms in the cluster sample was more representative of all land in the area sampled but not of land used for crops. The location of farms, like the location of rural residents not farming and the location of cropper and other tenant families on farms, is selective. The bases for selectivity in location are different for the various groups, so that members of none of the groups are distributed uniformly with reference either to area or to location of houses. The better soils are selected for farms; convenience to towns and villages and land not well suited to farming are bases for location of rural residents not farming; cropper and tenant families other than farm operators are on the largest farms on the best land. These facts suggest use of a specific selective basis for sampling farms, one that will to the fullest extent possible exclude the influence of other factors as sources of variation or reasons for unnecessarily large sampling errors.

A basis that is satisfactory for sampling all rural resident families in an area might also be satisfactory for sampling the kind of land on which occupied dwellings are located. But for sampling farms for research in farm management in an area in which a relatively large proportion of the rural residents are other than farm operators, a different basis for selection of a sample appears to be in order. The most accurate information available as to number and location of farms is that basis when the sample is to be used for estimating farm distributions and means within a general soils and type-of-farming area. A representative sample of soils used on farms

is essential to a representative sample of farms in areas similar to the one for which this comparison of sampling methods was made, and adjacent farms tend to have similar soils.

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PROFESSOR VAILE AND THE THEORY OF INVERSE CARRYING CHARGES

I AM disappointed that my treatment of inverse carrying charges seems to Professor Vaile "inadequate and unrealistic,"[1] but such a stricture alone might be accepted with reasonable equanimity. Theory always involves abstraction, and so cannot avoid being in some sense inadequate and unrealistic. Professor Vaile, however, charges specifically that the theory which I advanced "makes no start toward explaining" what it aimed to explain, and such a charge requires at least an attempt to remove misapprehensions on which it may rest.

Let me deal first with two comments of Vaile's which appear to be subsidiary, and then return to the major charge.

1. Vaile holds my theory to be unrealistic " . . . because whenever there are high inverse carrying charges, terminal grain merchants tend to modify their market transactions so that full contractual storage charges are paid on an increasing proportion of the total grain in store." I readily grant that the average return for storage received by a grain merchant who stores both for himself and for others is not measured by the market carrying charge (price of storage). Nor is it measured by the fixed price for contractual storage. The conclusion to be drawn is not that either the market price or the contractual price is unrealistic, but only that neither price by itself measures the return for storage received by that grain merchant. The case differs in no essential respect from that of the producer of a physical commodity who sells in two markets which have different price patterns, for example, a dairyman who sells part of his product as market milk and part to a cheese factory.[2]

[1] Roland S. Vaile, "Inverse Carrying Charges in Futures Markets," this JOURNAL, August 1948, XXX, 574. His discussion concerns my paper, "Theory of the Inverse Carrying Charge in Futures Markets," *ibid.*, February 1948, XXX, 1–28.

[2] Vaile may also have underestimated the risk he ran of seriously misleading people unfamiliar with details of the grain trade. The opportunities for giving effect

2. Turning from criticism to suggestion, Vaile holds that "it is not true" (as I wrote) "that

$$P_1+P_s-P_2=0 \tag{1}$$

but rather

$$P_1+P_s-P_2=\pm x \tag{2}$$

in which equation P_s is the constant standard charge for storage."

The significance of Vaile's suggestion becomes clearer if we allow P_s to retain the meaning I gave it, under which $P_s=P_2-P_1$ by definition. Then we may take C to represent the "constant standard charge for storage" and rewrite Vaile's equation (2) as follows:

$$P_1+C-P_2=x=C-P_s \tag{2'}$$

With this clarification, I can accept Vaile's reformulation, though I do not see what it gains; because C is a *known constant*, it makes little difference whether we undertake to explain P_s or $C-P_s$.

3. We come now to Vaile's charge that my theory "is inadequate because it makes no start toward explaining why the carrying charges are positive at one time and negative at another." I accept this as the main charge because the only merit I claim for my theory is that it *goes farther* than the generally accepted theory in explaining observed price behavior. Vaile has done his part toward permitting a test of effectiveness by applying the conventional theory to a particular set of price observations; I shall undertake to show that my theory serves better.

The problem Vaile poses is to explain price relations between the "December and the following May wheat futures in Minneapolis from 1900 to the present." He observes that persistent inverse carrying charges between the December and the May futures occurred "only in 1921 when the post-war foreign demand still was strong and the domestic crop was short, in 1934–37 when

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to the "tendency" he asserts are quite limited, for three reasons: (1) Under conditions which have prevailed during most of the last half century the amount of grain stored by "others" in terminal markets has been small relative to the amount stored by the operators of the elevators; (2) the conditions which have led merchants to store little grain in their own elevators have generally reduced similarly the amounts offered for storage by others; and (3) the terminal grain merchant who elects to store grain for others is not free to choose what proportion of his space shall be used by them. He is required by law to operate any elevator used for public storage as a public warehouse, and to accept any grain offered for storage, to the limit of the elevator capacity. In some states, such as Illinois, he is even prohibited from storing his own grain in any elevator which he uses for public storage.

the crop was seriously curtailed by drouth, and in the recent years of high post-war foreign demand. In all other years there were positive, although varying carrying charges between these two futures." Then he adds by way of generalization "Whenever supply is conspicuously short relative to demand, buyers bid up the cash and nearby prices in their efforts to obtain actual grain of desired quality."

If one asks no more than this by way of explanation, the traditional interpretation which Vaile wishes to retain seems to serve fairly well in such circumstances. But suppose we look a little farther into the facts, taking for example 1936–37, the crop year prior to World War II in which the inverse carrying charges between December and May at Minneapolis were most extreme. From mid-September through early December the price of the May future remained steadily about five cents under the price of the December future; thereafter the difference fluctuated somewhat erratically between five cents and nearly nine cents until the end of December. Average prices for the last full week of September and the first full week of December, and the spread between them in cents per bushel, were:

Week	December future	May future	Carrying charge
September 21–26	129.1	123.9	−5.2
December 7–12	136.9	131.6	−5.3
Price increase	7.8	7.7	− .1

Did the price of December wheat increase because demand became more insistent relative to supply? If so, why did the inverse carrying charge fail to widen correspondingly, in accordance with Vaile's principle of explanation?

Note also that stocks of wheat in Minneapolis for the week ending September 26 were reported as 6,408,050 bushels; for December 12, as 5,681,330 bushels; and that on the following May 1 there remained 3,567,427 bushels in Minneapolis elevators. Most of this wheat was hedged in the futures markets and subject, therefore, to a negative carrying charge. How shall one explain this condition?

To answer these questions, I start with the last and explain that the grain merchants and mills of Minneapolis require "goods on their shelves" and working stocks, and will carry large supplies with no return at all for storage as such, and smaller, but still substantial, supplies when the return specifically attributable to stor-

age is strongly negative. Having taken this view that the price relation between the futures should be considered as the return for storage necessary to induce the carrying of certain stocks by hedgers (or to induce a certain restriction of holdings), I find no difficulty in understanding why it should be possible, and indeed common, for the price relation between futures to remain relatively constant from week to week while prices change.

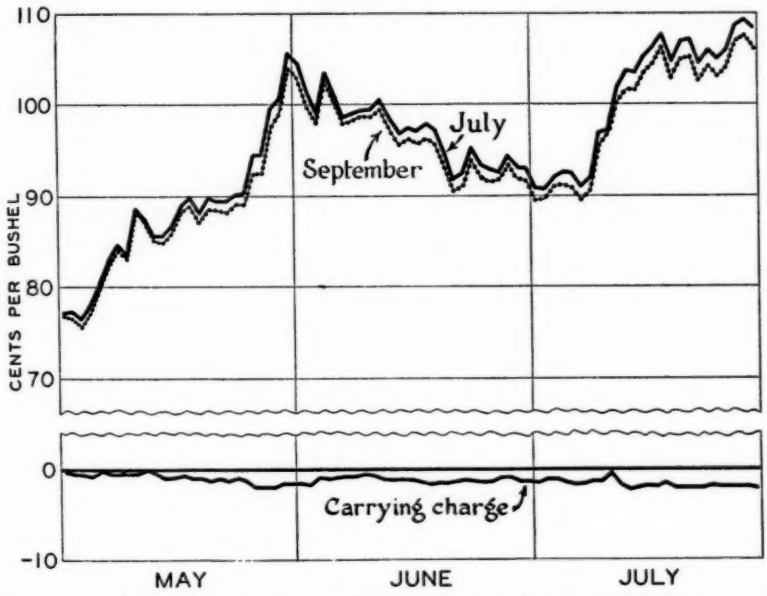

CHART 1.—Daily Closing Prices of Old-Crop and New-Crop Wheat Futures, at Minneapolis, and Price Difference, May–July 1934.

By concentrating attention on a price relation between two futures calling for delivery within the same crop year, Vaile avoids what in other circumstances is a most serious embarrassment to the doctrine that the two prices must be explained separately. If one studies the relation between the July and the September wheat futures at Minneapolis, the one expiring before the spring-wheat harvest and the other after harvest, and takes periods in which spring-wheat crop prospects changed substantially, it appears that the attempt at separate explanation breaks down completely. Consider for example, the period, May–July 1934, when severe drought in the spring-wheat area contributed to a sharp

price advance during May, good rains in early June encouraged a severe price reaction, and in July prices rose again in response to renewed drought in the spring-wheat area, together with a crop report which confirmed that much of the damage done in May had been irreparable.[3] Chart 1 tells the detailed story of wide changes in prices of the two futures and negligible change in the July–September carrying charge during these months.

It was such evidence as this which first convinced me of the futility of attempts at separate explanation of prices of different futures. *If, instead, one regards the influences pertinent to the price of the more distant future as bearing equally on the nearer one, and recognizes that the price of the nearer future is affected also by influences which bear specifically on the price difference between the futures, explanation becomes easy.* In this instance we may note that stocks of wheat in Minneapolis elevators, which were 18,672,000 bushels on May 5, declined in normal fashion to 14,647,000 bushels on August 11, and then rose, reaching 16,150,000 bushels on September 1. Most of this wheat was held by merchants and processors who wanted it for convenience and would have held somewhat larger supplies except for the existence of a small inverse carrying charge. Their disposition to hold was virtually unaffected, it appears, by the drastic crop developments of the period.

If Vaile found difficulty in seeing how to apply the ideas which I tried to set out, others must have experienced like difficulty. I hope that the foregoing explanations clarify the main problems.

HOLBROOK WORKING

Food Research Institute

[3] For a more detailed account of these developments see M. K. Bennett and Helen C. Farnsworth, "World Wheat Survey and Outlook, September 1934," *Wheat Studies of the Food Research Institute*, XI, (1), pp. 8–11.

BOOK REVIEWS

The Business of Farming, Herrell DeGraff and Ladd Haystead. Norman: University of Oklahoma Press, 1948, Pp. xviii, 244. $3.00.

This book is different. From title through addendum the authors have used a simplified style of presentation which is little used in Agricultural Economics books. The use of self-explanatory terminology rather than stock-in-trade or technical terms and the style employed in writing makes this book outstanding. A practical approach is used throughout the book, and research data is drawn from many sources to explain and illustrate salient points. The authors have presented their material under four headings and in a way which will incite the laymen to utilize a common sense business approach to farming.

Soil management is discussed in section 1, with the basic assumption of "success or failure in farming starts with the soil." In their discussion of soil management, stress is placed on the importance of soil resources available to the farmer on his particular farm and in his particular area. After evaluating the soil resources, various factors affecting the capacities and uses of soil are discussed. The assets as well as liabilities of humus, minerals, manures, and water are covered under the heading of soil management in relation to all sizes and types of farms in the United States. The authors seem fully aware of the magnitude of this problem and have cleverly and adeptly presented this section of the book stressing management problems of various areas of the country.

Equipment management is covered in the second part of the book. The field of equipment management is too often overlooked or passed over lightly in farm management books. The authors have presented facts from various research studies that will be of interest to almost anyone who is farming at the present time. Historical trends in the use of farm machinery are briefly presented. Farm tools are categorized into five classes—tillage implements, crop starting implements, cultivating implements, war implements (sprayers, dusters and weeders), and harvesting tools. A larger part of the discussion on equipment deals with power units. In the discussion on farm machinery, consideration is given to the various items of cost. The use of farm structures and electric power as production tools is included in this section of the book.

The field of labor management is discussed in part three. This section of the book stresses the worth of labor and the various problems a farm manager is concerned with in the use of labor. DeGraff and Haystead have approached labor management from a realistic standpoint. The use of family labor is analyzed in a business light and discussion is devoted to the principles of labor management for family and hired labor.

A discussion of farm organization is presented in part four. In studying farming as a business, the problem of management is a problem that is difficult to evaluate. Adequate research is not available as a basis for evaluating the degrees of good or bad management. The authors have included in this section some of the various techniques used in measuring success of management and discussed choice of enterprises as it relates to success in farming, diminishing returns as a guide to management, use of farm accounts, and importance of farm business analysis to affect success in farming as a business.

DeGraff and Haystead have written a book that will be of interest to the individual farmer because it offers a body of principles which aid in determining problems and their solution. This book will appeal to anyone who is interested in the business approach to farming. It is a practical analysis of farming as a business, well planned, and exceedingly well written.

W. A. CHASE AND JOHN W. WHITE

University of Arkansas

Agricultural Economics, Benjamin Horace Hibbard. New York: McGraw-Hill Company, 1948. Pp. XXXIV, 433. $5.00.

"The world that agriculture faces is always changing rapidly." In these words, Professor Hibbard describes the circumstances that make his own most recent book another reflection of economics in transition. Since economics is always in transition, this statement requires elaboration. On page 15, for example, it is stated that "The soundness of subsidies has not been established." Those economists who believe the American economy is or can be made largely competitive, with Government functioning mainly in the role of policeman, will be somewhat surprised at this statement. In their minds, there is not a shadow of a doubt that "subsidies" are "unsound."

On the other hand, those who see the American and other national economies as monopolistic to the core and certain to remain so, with a more or less competitive fringe that includes agriculture and other minor occupations, will call the statement old-fashioned. Professor Hibbard's tendency to stand with one foot on the firm ground of free trade principles while at the same time admitting the necessity for, or acquiescing in, interference is characteristic of our times. Not many economists are clear as to the proper role of Government in the economy.

He arrives at his general position, not by any rational set of abstract principles—or by what some economists would call theory, but by his intimate knowledge of history. He says (on page 44) that even the farmers knew that Coolidge's ideas on farm relief "were old—accepted, and probably out of date, while he (Coolidge) was still an undergraduate."

Dedicated "To my graduate students, 1913–40," this volume is by one of the most human of men ever to write on the subject of agricultural economics. Reared on an Iowa farm in the decades immediately following the Civil War, he felt all the economic, social, and political issues of that time in the Corn Belt. His interpretation of these issues is a part of him and is reflected in this book, which consists of 34 short chapters on subjects he discussed most with his students. After defining agricultural economics very broadly, Professor Hibbard mentions a number of subjects that are included within its scope. He then says he "might have included farm management among the sample subjects," but he didn't. Only those who know and love him will understand why.

This reviewer studied under Professor Hibbard during the second quarter of the period covered by his graduate teaching. Professor Hibbard was a master of repartee. No agricultural economist living then or now would have felt comfortable in public debate with him because of his ability to turn the phrases of his opponent to his own advantage. He engages in this activity at the conclusion of his chapter on the Farmers' Union (pp. 374–376), where he quotes the Union's opposition to trade barriers and isolationism and its support of parity prices. To him, the two positions are inconsistent, but they may be merely more evidenced of economics in transition.

Unfortunately, it has been impossible to register his scintillating humor on the printed page. His tones, accents, and the twinkle of

his eye are missing. And yet, the book does contain some *Hibbard-isms*, as we used to call them. On page 9, for example, he says, "Hunger without money makes no appeal except to charity; hunger has never impressed charity at long range, and a faint impression has never evoked great contributions." If we correct the statement by pointing out that hunger without money has made a very great appeal to the fear of communism, we have left a very important economic truth well-stated.

But it will be a surprise to his former students to read on page 12 that a "fair price" is "probably somewhat below the level of prices we pay for what we buy," or on page 14 that it is "twice that of 1934." My notes taken during his lectures say that a "fair price is what you can get, plus 10 percent."

The book gives greatest emphasis to tenancy, tariffs and farmer movements. Considerable attention is devoted to farming as an occupation and to the reasons for both excessive numbers of farmers and surplus farm output. Some of his most acute observations are on these subjects. In a chapter on "Agriculture Under the New Deal," the name of Rexford Guy Tugwell is conspicuously absent. His final chapter entitled "After the Second World War" quotes with approval Mordecai Ezekiel's advocacy of American efforts to aid in the industrialization of foreign countries as a means for expanding world trade. But lest we become too enthusiastic about the possible success of such a program, he warns that "Selfishness is powerful and ignorance is a precipice."

Because, he says, (page 433) "what we most need, and eventually must have, is reestablished world trade," and because he sees the difficulties in achieving that goal, his outlook for the years immediately ahead is somewhat pessimistic. When, as an economist, he says "We are apparently headed for a dreary period such as the thirties . . . ," he will be recognized by some as a spokesman for the *dismal* science.

A conspicuous, if not important, weakness of the book is the fact that the most recent statistics used in charts and tables are for 1945. Then, too, if the scope of agricultural economics is as broad as Professor Hibbard's definition, it cannot be taught with this book alone, a fact the author himself clearly recognizes. Too little attention is given to the economics of soil conservation or to the role of monetary and fiscal policy in stabilizing the economy generally—matters of very great concern to farmers today.

Even so, the former students of Professor Hibbard will value this book highly, and it will most certainly serve well the purpose modestly described in the preface, namely—" to make it somewhat easier to present the many aspects of the subject."

BUSHROD W. ALLIN

Bureau of Agricultural Economics

Population Analysis, T. Lynn Smith. New York: McGraw-Hill Book Co., 1948. Pp. xiii, 421. $4.50.

The recent revival of the gloomy forebodings identified in Economics literature with the name of Malthus are leading economists to reexamine the field of demography, which, in this country at least, has become largely separated from its parent discipline. Smith's book, *Population Analysis*, provides them with an account of the data about population that are available in the United States, along with some notes on data available elsewhere. Nearly every chapter describes the types of data available in the United States, their sources and the weaknesses that exist, and there are occasional suggestions to the agencies producing such data for improvement of their basic materials. Some attention is given to the methods used in extracting meaning from the figures, and numerous conclusions and observations are given. For these the author draws heavily upon his own field studies and analyses of data assembled in Census and Vital Statistics reports. One hundred and sixty-six charts, maps and graphs make more vivid many of the relationships that are mentioned or discussed.

In this manner the reader is led through the several fields that generally are included under the heading of demography. One part deals with those aspects usually grouped as the composition of the population, including residential distribution, age, race, nativity, sex ratios, marital, educational, and occupational status, and religious composition. Another part deals with birth and death rates and their measurement and trend. Migration, both internal and international, are given more attention than is usual in academic treatments of this subject.

The author in the preface states that an attempt has been made to treat the subject in language that can be readily understood by the advanced undergraduate in college or university. This reviewer, who has not recently presented such materials to undergraduates, however cannot help asking whether it is necessary to write down

to undergraduates to the extent that this book does, or to pass over lightly and in some cases deprecatingly the more involved procedures that have been developed for some aspects of population study. In stressing an empirical approach to the study of population phenomena the author clears away much of the wordage that has filled demographic literature. He also gives scant attention to some problems which for the time being must be analyzed with scanty data. Granted that the U. S. in many ways lags behind other countries in respect to demographic statistics the critical appraisal could well have given more attention to the numerous improvements introduced into the 1940 Census. A large number of publications since 1940 give evidence of a continuing program of testing new definitions and new approaches to data. This program has already provided significant new results and promises more for the future.

CONRAD TAEUBER
Food and Agriculture Organization of the United Nations

The Farm Bureau Through Three Decades, O. M. Kile. Baltimore: Waverly Press, 1948. Pp. ix, 416. $3.50.

This 403 page book, by O. M. Kile, opens with a foreword by Allan B. Kline, president of the American Farm Bureau Federation. This foreword says in part: "The story of the growth and development of the Farm Bureau is one of the great stories in American agriculture. It is important to have that story documented now, while many of the early leaders in the movement are still alive. This book does that."

"Written by a man who served on the information and legislative staffs of the American Farm Bureau Federation in the early days and who has maintained a deep interest in the organization since the beginning, it is authentic and accurate."

"Mr. Kile has rendered a great service to Farm Bureau in recording the story of the organization from infancy to maturity."—

From the foregoing, it is evident that the book is written by one who knows the early history from the inside and that it has the approval of the current president as a semi-official history of the Farm Bureau movement.

It is well-written by one who believes in and defends almost every action rather than from the coldly analytical viewpoint of a hard-

boiled economist. There is good reason to believe that the factual material is authentic. This is indicated by the following from the author's preface, "I am particularly indebted to John J. Lacey, Director of Information, for his careful scrutiny and constructive criticism of the entire manuscript and various revisions thereof, and to W. R. Ogg, Director of the Washington Office, for checking on the accuracy of those matters that have come within the purview of his twenty years in the thick of legislative battles. My thanks go also to Chester Gray for his careful reading of most of the manuscript and for his helpful suggestions."

The main body of the book is divided into seven parts, as follows:

Part I—The Historical Background:

These three chapters cover: 1, earlier farm organizations and what became of them; 2, the beginnings of the County Agent system; 3, the organization of county Farm Bureaus; 4, the organization of county Farm Bureaus into State organizations and 5, the birth of the American Farm Bureau Federation at Chicago, November 12–14, 1919.

Part II—The James R. Howard Administration, 1920–22

These five chapters cover the early activities. Two major ones were:

1. Sponsoring national cooperative set-ups in grain, livestock, cotton, wool, fruit, vegetables and other commodities.

2. Bringing the influence of the organization to bear on Congress. The author gives the Farm Bureau credit for having had a large part in the formation of the "agricultural bloc."

The author credits the Farm Bureau in this period with securing the Capper-Volstead Act, packer and stockyards control, regulation of grain exchanges, and other legislation.

Part III—The Oscar E. Bradfute Administration, 1923–25

These two chapters cover the bitter strife between Aaron Sapiro and his adherents who wished to make the promotion of cooperative marketing of the Sapiro type the big activity—and such men as John Coverdale, secretary and O'Neal of Alabama who saw large opportunities in other fields.

Part IV—The Sam H. Thompson Administration, 1926—March 1931

Mr. Thompson, according to the author, understood full well that he was elected with the expectation that promotion of legislation of the McNary-Haugen type was to be a major activity of the organization. The three chapters are largely devoted to the battle over the McNary-Haugen bills and the compromise legislation that resulted in the Federal Farm Board.

Part V—The Edward Asbury O'Neal Administration, 1931–47

These 10 chapters cover the struggles over the major agricultural legislation of the 1930's, the price control legislation of the war period and the post-war period through 1947. The first chapter has the title, "Wedding of the South and the Mid-west." Apparently, in view of the author, the great achievement of President O'Neal was to weld the agriculturists of the South and Mid-West into a smooth working organization that was able to exert much influence on legislation.

Part VI—The Allan B. Kline Administration, December 1947

These three chapters cover the problems confronting the organization as Mr. Kline took over the leadership in December 1947. The author reviews the major activities under way and the membership strength by states with some comparisons to that of other farm organizations.

Part VII—Assets, Problems and Prospects

This part is a concluding chapter in which achievements are summarized and the problems of relations with the State Extension Services, County Agricultural Agents, relations with other farm organizations and with the public, are considered.

The author says, "Probably the greatest accomplishment of the Farm Bureau in its three decades of existence has been to establish a 'voice' for agriculture."

"While there may at times appear to be several 'voices' in the agricultural field, few would deny that the American Farm Bureau Federation is the recognized voice. Others are heard respectfully and on some subjects have influence but any legislative or adminis-

trative measure dealing with agriculture that is opposed by the AFBF is not likely to get far."

Since the Farm Bureau has been on one side or other of much of the agricultural legislation that has been considered by Congress since 1920, the book, to a considerable extent, is a history of agricultural legislation proposed and enacted since that year. It gives considerable light as to what went on behind the scenes.

Wm. L. CAVERT

Farm Credit Administration of St. Paul

Labor Productivity Functions in Meat Packing, William H. Nicholls. Chicago: University of Chicago Press, 1948. Pp. xviii, 256. $5.00.

Professor Nicholls has submitted the record of fluctuations of inputs of hogs, men, hours, and payrolls for two years in a midwestern packing plant to a very detailed statistical analysis. His purpose is to approximate "the static short-run production and cost functions of economic theory" (p. 51). His objective seems to me a mistaken one; his achievement of this purpose is almost impeccable.

Why should anyone want to approximate the textbook curves, except possibly to supply illustrative material for more textbooks? Suppose one finds, as Nicholls often does, diminishing marginal returns to labor—then surely the complacent theorist will simply say, "I told you so." Suppose one finds, as Nicholls also often does, increasing marginal returns to labor—then the complacent theorist will say (in fact theorist Nicholls does say), "These results cast considerable doubt on the accuracy of the [results] obtained in this investigation." (p. 15) (I think this is as wrong a first reaction as is the superficial alternative of rejecting the theory.) This is not quite fair to Nicholls because he does investigate one relatively neglected problem (discussed below), but it is a substantially accurate description of his approach. He is not testing economic theory, nor is he enlarging or improving it—he is simply illustrating it.

Given his goal, the performance is exemplary. The data are carefully described and reproduced; the technical background of the industry is adequately summarized; the statistical calculations are reported in sufficient (and perhaps in excessive) detail; and the conventional theory of cost curves is stated carefully. His standards of craftsmanship deserve high praise and wide imitation. The only questions I would raise concerning the performance are trifl-

ing, e.g., his third general conclusion is inconsistent with the first two if one disregards words like "nearly" and "slightly" (p. 24).

One problem of cost curve analysis is given new prominence: the selection of the optimum-combination of men and hours of work per week to minimize the labor cost of a given output. As a formal problem it introduces no new principles (Ch. IV); it is analogous to the choice between durable and non-durable machinery except for the absence of interest complications. The tendency of the findings is that in this particular plant the number of men is subject to diminishing returns but the work-week is not (within the range of variation considered), so costs could have been reduced slightly by using fewer men on longer work weeks.

I would, however, enter a vigorous dissent from the use of the "let sleeping dogs lie" theory of welfare economics implicit in Nicholls' discussion of the Fair Labor Standards Act. He argues that the Administrator did not apply the overtime provisions with due allowance for the nature of meat-packing, but that no change in policy is now called for because the industry has become adjusted to the mistaken ruling. If Nicholls will apply this theory to silver legislation and entrenched monopolies he may come to share my dissent.

GEORGE J. STIGLER

Columbia University

Rural Sociology, Lowry Nelson. New York: The American Book Company, 1948. Pp. xvi, 567. $4.25.

Of the many rural sociology textbooks no two follow the same plan of treatment due to the various authors' pedagogical judgments but also undoubtedly due to the fact that general courses in rural sociology are quite differently oriented to the college curriculars of different types of institutes. The early rural sociology textbooks were primarily surveys of rural social problems and issues. The recent trend has been for them to include general sociology or theoretical orientation for the rural social situations and problems dealt with. Dr. Nelson's book is as successful as any in this latter undertaking.

Another reason for the lack of standardization or of evenness of treatment in rural sociology textbooks is that no one author can be expert in all fields and each naturally, therefore, writes some excellent and generally some mediocre chapters. This is probably the

only way to meet the problem with which an author is confronted. Some of the most successful textbooks for those whose only course in sociology is a course in rural sociology do little more than survey the research findings which have been developed over the last 30 years, compile numerous statistical tables and make some practicable application of the data which they present. Such books are naturally very inadequate in sociological treatment. Undoubtedly other authors go too far in the opposite direction, include considerable sound sociology but very often make very little application of it to specific rural social situations. Some of these latter have very strong chapters in the fields of the author's specialty and other chapters are often weak. The author of this book follows this second plan but by and large does it quite successfully. He covers all of the basic topics with which all rural sociology deals and each chapter contains a sound sociological orientation.

Some chapters are very successful in handling topics which other authors, specialists in given fields, over-emphasize and because of this over-emphasis are weak at other spots in their books. Examples of successful balance in this book are Chapter 5 on The Rural Community, Chapter 6 on The Rural Population, Chapter 11 on Stratification and Social Status, and Chapter 16 on Levels of Family Living.

A number of chapters are excellent, probably superior in many ways to those in other rural sociology textbooks, superior in their sociological orientation by means of introductory statements, and definitely follow through with the practical application of that sociology in the detailed presentation of data and in discussion and interpretation. These chapters are Chapter 15 on Marriage and the Rural Family, Chapter 17, Religion and the Rural Church, Chapter 24, Rural Welfare, and Chapter 25, Health and Health Agencies. The last chapter on the Outlook for Rural Life is also good but would be better if it were more ample. The author provided materials in his own textbook for amplification of this chapter.

This text gives evidence of the maturity in scholarship and philosophy of its author. It will be very useable as a textbook in general rural sociology so far as the college student is concerned and it makes a definite contribution to other sociologists who are working in the field of rural sociology.

CARL C. TAYLOR

Bureau of Agricultural Economics

Rural Life in Argentina. Carl C. Taylor. Louisiana State University Press. Baton Rouge. 1948. Pp. vii, 464. $6.00.

Rural Life in Argentina, contains all of the aspects of our national agricultural life, described with clarity and notable erudition.

All of the farm areas have been visited personally by the author and carefully observed. We can note the systems of production as well as the mentality of the Argentine farmer, who, because of his southern European origin, presents special characteristics, which attract the attention of the American investigator, on comparing him with the North American farmer, and the physiognomy into which he fits, thus, making a clear judgment of the nature and magnitude of the elements which participate in this complex phenomenon.

The method utilized by Dr. Taylor in this book is one which is advised by the most modern technique in the subject matter of investigations of this type. It has permitted him to expose in an orderly fashion a profound and thorough study of the panorama which our agricultural economy offers, in the internal as well as the external economy of the enterprise. An important analysis of the social scene in which our agricultural phenomenon takes place, and the consequences of the particular facts are studied along with the rest of the cultural, economic, moral, and political, etc. activities, typical of our peoples.

A year of daily investigation, visiting areas, reading the most noted authors who have been concerned with this subject, conversing with the farmers themselves, business men, sociologists, statisticians, research workers, etc., permitted the author to accumulate a wide fund of information, which conditioned by the actual reality of the situation, put him in position to write a book which is a faithful picture of our rural life.

One observes without any effort the sociological orientation of the author of *Rural Life in Argentina* because of the attention which the study of the man-factor and of that of social institutions, such as the family, the school, the church, etc., receives; topics, which the author presents with many statistical charts and illustrations, studying our agricultural worker also in the light of the functioning of the urban phenomenon, in order to draw conclusions which include the rural medium and its bearing on the rest of the population.

When the North American reads this book, he will have a clear and complete concept of what our weight is in the international market of farm products, and, also, he will be able to form conclusions about our culture, our institutions, the working capacity of the people, etc. As a result of this we Argentines and North Americans will understand each other better. Dr. Taylor's book has made an enormous step which will serve as an extraordinary contribution in the procuring of a real collaboration and mutual respect between both nations.

Rural Life in Argentina is a book within the reach of all levels of culture, because it is written with a lucid and simple style, without sacrificing anything of profundity; it is ample in its scope and given to an admirable sincerity. Likewise it is a work which ought to be known and studied by every student of these questions, because it is a faithful reflection of our reality, and it is, as well, a book for all of the reading public.

RAUL GARCIA

Assistant Professor of Economics
National University of Córdoba, Argentina
Before the Perón Regime

Future Food and Agriculture Policy. John D. Black and Maxine E. Kiefer. New York: McGraw-Hill Book Co., 1948. Pp. viii, 348. $3.50.

This is an important book, not only because it deals with a significant current problem, but also because it is an authoritative statement by a leading agricultural economist who has been steeped in the problem for many years. There is no way of detecting the specific contributions of the senior and junior authors, but the style and positiveness of statement are characteristic of the senior author. His hand is apparent in every part of the book.

Part I deals with the facts regarding food, nutrition and agriculture in 1947 in the United States. The remainder of the world is covered in less detail. These data are well known to workers in the field but their summarization and selection are excellent.

Part II deals with the parts of the problem. Except for the very short run, the basic problem is that of the ratio of the population to food-producing resources. This relationship is very bad in a considerable portion of the world and the authors are generally pessimistic with respect to the future. After reviewing estimates of the productive resources of the world and potential trends in popula-

tion and output, the authors reach the conclusion that, " . . . except in the newer countries and in those with possibly expanding frontiers, the foods needed for a continuously expanding population cannot be produced. In some of them the foods needed for adequate diets for their present populations cannot be produced within their own boundaries." (p. 147) The answer must lie in population control which is a difficult and long-time adjustment. The authors are emphatic that the haves should not level themselves down by direct sharing with the have-nots. They say, " . . . and as for the general argument that the countries with good diets should share their foods with the people of the densely populated regions, one has only to point out that, if they had done this in the last 300 years, most of them would now be down close to the Malthusian level of subsistence. The hope of the world is in the countries which have escaped such a fate and can now help the rest of the world to escape from it." (p. 169) Black has always been an advocate of specialization and freer trade, but like many of us views the removal of existing trade barriers and trade restrictions as improbable in the foreseeable future. We shall, therefore, have to get along for a time as best we can with them.

Part III develops the programs which the authors consider essential for the solution of the problems presented in the earlier section. The most important chapter is XXI which outlines in concise form the senior author's agricultural program for the United States. Dr. Black would establish an annual national quota for each crop but no individual producer quotas. If the actual crop exceeds the quota, producers are entitled to payments, if any, only on the proportion of their sales which the established quota constitutes of the total crop. The crop is to be sold in the market for what it will bring, with supplemental payments made to the farmer to bring market prices to "total prices" when the former are lower. The very interesting suggestion is made that these supplemental payments be made to the farmers as grants-in-aid on a 50-50 basis for approved production practices or investments in the farm following the adoption of a long-time individual farm program. This program is to be approved by experts. This form of payment seems to the reviewer to possess real advantages. In the nutrition portion of the problem, the proposals are not as precise. The view is expressed that, "nothing short of a vigorous program of direct food distribution measures will meet the needs of the situation facing

this country and the world in the next ten years." (p. 223) The funds for both the agriculture and the nutrition program are to come from the treasury. "The logical procedure is to make a joint appropriation large enough to cover both, and to distribute the sum between them each year in whatever way will contribute most effectively to the two objectives—raising and stabilizing agricultural income and improving diets." (p. 224) The cost is estimated at about two billion dollars in a normal year.

The last seven chapters which constitute Part IV are devoted to problems of execution. The authors indicate that a great deal of attention has been given to these phases of the work. The basic problems, however, remain unsolved. Economists may formulate excellent programs but are frequently unable to implement them. In view of the present temper of Congress and the apparent aims of farm leaders, one fears that the program of the authors stands little hope of adoption. Nevertheless, it is worthy of careful study.

WARREN C. WAITE

University of Minnesota

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REPORTS

Report of the President, 1948

Our Association has vigor and vitality. The contributions which the officers and other members have made when called upon to serve have been most gratifying. To quote chapter and verse I refer the reader to the reports appearing at the end of the November 1948 issue of the JOURNAL. These reports give an excellent summary of the activities during the year.

I wish to express my gratitude to Frederick V. Waugh who, in my estimation, has made an outstanding contribution to the Association during the year in serving first as chairman of a policy committee and second, as chairman of a committee to formulate a procedure for the administration of our special awards program.

Julius Hendel as chairman of the group designated to raise the funds for the special awards has been unusually successful. His work and that of his colleagues, H. B. Arthur and A. C. Hoffman, in raising over $13,000 provide an excellent example of outstanding service for the Association by members who believe in its future.

This past year the vice presidents were given heavy assignments which they accepted cheerfully. Earl Butz tackled the student chapter assignment and served on the policy committee. His report on student chapters at the annual meeting and the action of the membership at that meeting in approving a constitutional amendment providing for student chapters marks, I believe, a milestone in our Association history.

Harold Hedges, our other vice-president, tackled the annual meeting problem. His report in the November 1948 JOURNAL charts a new course for the Association, the holding of annual meetings in the summer in different parts of the country affording a larger opportunity for cooperation with affiliated groups. I hope it will be possible following our meeting with the Western Farm Economic Association at Laramie, Wyoming, in 1949 to have similar meetings with the Canadian Agricultural Economics Society and the agricultural economists of the South. This is a worthy experiment in my estimation provided we expand our meeting each year with the American Economic Association, the American Statistical Association and allied groups. If we are to maintain our hybrid vigor I consider it imperative that we not lose contact with our parent strains—particularly economics and statistics.

A complete index of the JOURNAL was recommended by the Executive Committee. Harold Hedges initiated negotiations with the Washington, D. C. chapter of the Special Libraries Association for the preparation of such an index. It appears likely that such an index will be completed in 1949. We hope it will be possible to publish this in combination with a directory of the membership.

The high standard which our JOURNAL has attained is evidence of the vitality of our Association. I am sure I speak for the membership in extending to Warren C. Waite, retiring editor, our thanks for a remarkably fine editorial performance.

The growth of our membership presents us with new problems. An important one is the added burden placed on our secretary-treasurer Larry J. Norton, who is retiring this year as secretary-treasurer, has made a convincing case in his report in the November issue of the JOURNAL for added financial aid for the office of the secretary-treasurer. I believe, as he says, that the Association will grow more rapidly if added financial assistance is provided.

Progress this year has been made on the volume of readings on agricultural policy. O. B. Jesness accepted the editorship with an advisory council of H. DeGraff, F. F. Elliott, L. P. Gabbard and H. R. Wellman. Dr. Jesness reports as this is written that the material is almost ready for the publishers.

At this point I want to express appreciation for the assistance I have received from my three immediate predecessors, Asher Hobson, Frederick V. Waugh, and Larry J. Norton. Many of our accomplishments this year are a result of policies initiated while they were president of the Association.

In passing the baton to our next president, O. V. Wells, I have two suggestions. First is the need for a study of our constitution including some change in our election machinery to make for more continuity in our officers. This year all four officers and the editor are changing. The fact that a new president may have had no contact with the executive committee prior to his election is, I believe, a serious handicap. The necessity to carry forward projects for several years plus added activities such as the special awards program and student chapters make it desirable that we elect a president a year in advance either as a vice-president or as a president-elect.

My second suggestion is the need for a wide participation in the preparation of the programs. The AFEA has expanded to a point where it is difficult for the president to prepare the programs without considerable assistance. Since some of the meetings are now being planned over a year in advance, a president-elect might be a welcome aid to the president, especially if one of his duties was service on the program committee.

In closing I want to express my thanks to you, the membership, for your splendid support. This year as your president has given me a satisfaction for which I am deeply grateful. I wish for the Association continued expansion in members, vitality and service to our profession.

WILLIAM G. MURRAY, *President*

Report of the Editor

Volume XXX of the JOURNAL consisted of four regular issues totaling 852 pages. The proceedings of the Green Lake meeting will be published as Part II of the February 1949 issue.

The JOURNAL is a cooperative venture of the Association. This is indicated by the fact that 89 different persons contributed to it in the way of articles, notes and reviews. The Editor wishes to thank these contributors and the others for whom space limitations prevented publication for their generous cooperation. He also wishes to express his thanks to the Editorial Council and the Associate Editors for their continued interest and support. It is with regret that these associations are terminated.

The Executive Committee has authorized the preparation of an index to cover the first thirty volumes of the JOURNAL and has arranged with the Washington Chapter of the Special Library Association to carry out the task. The final arrangements have been left for the incoming Editor since the index will not be completed for some time.

The Distinguished Publication Award of the American Farm Economic Association for the year 1947 was made to Mr. Willard W. Cochrane for his article on "Farm Price Gyrations—An Aggregative Hypothesis" which appeared in the May 1947 issue of the JOURNAL. The committee selecting the paper was composed of F. V. Waugh, F. F. Hill, E. C. Young and the Editor. In view of the new special awards grants the Executive Committee might well consider the desirability of continuing this award. If it is continued, selection might well be made by a broader committee than has made the earlier selections. The Editorial Council as a whole would appear a suitable group. A suitable placque or memento should accompany the award.

There were 33 articles with 4 accompanying discussions, 23 notes and 30 reviews in the JOURNAL the past year. The division of the printed matter was as follows:

Issue	*Articles including discussions*	*Notes*	*Reviews*	*News items*	*Annual reports*	*Other*	*Total*
February....	141	26	18	7	6	6	204
May.....	121	47	18	6	3	5	200
August.....	159	34	15	10	0	6	224
November...	131	34	20	7	14	18	224
Total.....	552	141	71	30	23	35	852

The quality of the JOURNAL depends upon the contributions which come largely from the members of the Association. The Editor and even the Editorial Council cannot possibly be aware of all the prospective articles of high quality which should appear in its pages. It is the responsibility of everyone in the Association to direct suitable material toward its pages and to inform the Editor of prospective sources of outstanding contributions.

Respectfully submitted
WARREN C. WAITE
Editor

Report of the Auditor

In accordance with the request of the President of the American Farm Economic Association, I have examined the accounts of the Secretary-Treasurer, Professor L. J. Norton, for the year ending November 30, 1948. I have checked vouchers, cancelled checks, bank debit slips, and bank statements with expenses as shown in the treasurer's books and found the book statement of expenses correct.

I have checked bank deposit slips, bank credit slips, and bank statements with receipts as shown in the books and found the book statements of receipts correct. I have checked the bank balance on November 30, 1948, with the books and found them in agreement. I have inspected the stock certificates and bonds kept in a safety deposit box in the Champaign National Bank, Champaign, Illinois, and found them as stated in the treasurer's annual report.

I have checked the treasurer's annual report, as prepared by the secretary-treasurer, with the books and found them in agreement.

Respectfully submitted,
R. H. WILCOX, *Auditor*
December 10, 1948

Report of the Secretary-Treasurer for Fiscal Year Ended November 30, 1948

Membership. Membership and subscriptions totaled 2,007 at the end of the fiscal year, distributed as follows:

	1946	*1947*	*1948*	*Increase*
Individual members	965	1,124	1,269	145
Junior members	79	106	173	67
U. S. libraries and firms	244	327	324	−3[a]
Foreign libraries and firms	160	205	230	25
Exchanges	11	11	11	0
Total	1,459	1,773	2,007	234

[a] Includes cancellation of one large multiple subscription.

New members or subscriptions were as follows:

Individual members	179
Junior members	126
U. S. libraries and firms	38
Foreign libraries and firms	83
Total	436

Finances. In spite of much higher printing costs caused by higher rates and the supplement to the November 1947 issue, the Association had a small net operating income and after allowing for investment income, cash income exceeded expenses by $2,062.54. The rate of return on the Association's securities (cost basis) was 3.67 percent.

Contributions to the Special Award Fund totled $13,425. United States Treasury Certificates (1¼ percent) were purchased in the amount of $15,000

Operating Income and Expense
Year Ended November 30, 1948

		1948	1947
Operating income			
Net receipts from dues	$10,030.90		
Back numbers sold	1,124.11		
Reprints sold	1,174.15		
Advertising sold	90.00	$12,419.16	$9,362.36
Journal printing			
Four issues and November supplement	$ 9,409.78		
Five reprints	907.35	$10,317.13	$6,151.58
Operating Expenses			
American Institute of Cooperation	25.00		
Annual meeting	381.15		
Back numbers purchased	219.00		
Best Article Award, 1947	100.00		
Editorial expenses	77.31		
Executive committee meeting	528.78		
Library custodian expenses	52.29		
Office supplies	116.12		
Postage and wires	186.10		
President's expenses	142.27		
Secretary's expenses	96.15	1,924.17	1,624.08
Total expenses		$12,241.30	$7,755.66
Receipts above expenses		177.86	1,586.70
Dividends and interest		1,805.25	1,073.66
Sales of stocks and rights received on dividends		79.43	142.29
Total receipts above expenses		$ 2,062.54	$2,802.55

Financial Statement
December 1, 1948

Assets		
Cash	$ 6,035.16	
Stocks, market value	17,849.75	
U. S. bonds and certificate	43,895.10	
Total	67,779.91	
Liabilities		
Reserve for Special Grants Fund	$13,425.00	
Net worth	$54,354.91	

Adjustments in Net Worth

Net worth, December 1, 1947	$53,603.31	
Net income, 1948	2,062.54	
Increase in value, U. S. bonds	45.00	$55,710.85
Deduct		
Amortization on bonds to par value	199.46	
Stocks and rights sold	70.23	
Decline in value of stocks held	1,086.25	1,355.94
Net worth, December 1, 1948		$54,354.91

Respectfully submitted,
L. J. NORTON, *Secretary-Treasurer*

NEWS NOTES

The Seventh International Conference of Agricultural Economists will be held at Stresa, Italy, August 21 to 28, 1949. Stresa is on Lake Maggiore in Piedmonte, with hills rising steeply from the shores of the lake and the Alps beyond. Few places in the world can combine such facilities for holding a conference with a wealth of natural beauty. If possible, it is planned to organize two tours in connection with the Conference, one before and one after, each lasting approximately one week. The tour following the Conference is to be in Italy, with three days in the agricultural regions of the Po Valley, and the rest of the time in the region of Florence and Rome. The one before the Conference is designed to meet the needs of people who will arrive at English Channel ports, and it is planned to spend a week visiting farms and sight-seeing in Belgium, France, and Switzerland.

Anyone interested in attending the Conference should notify J. R. Currie, Research Department, Dartington Hall, Totnes, Devon, England, sending copy of his letter to E. C. Young, Purdue University, Lafayette, Indiana.

The American Institute of Cooperation will hold its annual Summer Institute on the Campus of the University of Wisconsin August 22–25.

A Farm Construction Section has been formed in the Division of Agricultural Finance of the Bureau of Agricultural Economics, with Roy J. Burroughs in charge. Research and service activities in reference to housing and farm service buildings will cover finance, supply, prospective volume of construction, and formation of capital. Dr. Burroughs is also teaching two courses during the second semester—one in economic principles at the Department of Agriculture Graduate School and one in housing finance at American University.

A land classification study is being made of Haywood County, North Carolina, Jefferson County, Tennessee, and Graves County, Kentucky. Cooperating agencies are Bureau of Agricultural Economics, Tennessee Valley Authority, Soil Conservation Service, and the agricultural experiment stations of the three states. S. W. Atkins, BAE, is coordinating the study.

The Iowa State College has announced a Land Economics Institute from June 13 through July 20, 1949. The Institute is dedicated to a better understanding of our major land problems and what can be done about them. All courses in the Institute carry graduate credit and are designed to fit the needs of (1) educational and research workers, (2) administrators of land programs, (3) students working towards advanced degrees, and (4) all people desiring a better understanding of our basic land problems and analyses of alternative solutions.

In addition to a wide selection of courses in land economics and related fields a special seminar in Land Problems and Policies will be offered. This seminar will include lectures and discussions conducted by outstanding students of land problems from different sections of the nation.

A folder describing the Institute in more detail may be obtained upon request to the Economics and Sociology Department, Iowa State College, Ames, Iowa.

The Hyderabad Government has invited Mr. A. W. Ashby, C.B.E., M.A., who is the Director of the Agricultural Economics Research

Institute, University of Oxford, to assist in a review of provisions for research and teaching in agricultural economics.

G. H. Aull, Head of the Department of Agricultural Economics and Rural Sociology at Clemson College, was recently elected President of the Southern Economic Association.

William B. Back has returned to the Farm Economics staff of the University of Kentucky after spending 15 months at the University of Chicago and Iowa State College where he was engaged in further graduate work toward the Ph.D. degree.

Charles K. Baker is on leave from the Extension Service, Agricultural and Mechanical College of Texas, to work with the cooperative Research and Service Division, Farm Credit Administration on a study of citrus marketing costs under the Research and Marketing Act.

E. Lloyd Barber, who for the last year has been doing research in farm mortgage distress for the National Bureau of Economic Research, has returned to the Bureau of Agricultural Economics and is in the Short-term Credit Section of the Division of Agricultural Finance.

Earl H. Bell has accepted a position as professor of sociology in the Maxwell School of Citizenship, Syracuse University. Dr. Bell was for 8 years a social scientist on the staff of the Bureau of Agricultural Economics. He recently returned from a year in Warsaw, Poland, where he headed the work of the United Nations International Emergency Children's Fund in the distribution of milk and food supplies.

Charles E. Bishop, assistant in farm management at the College of Agriculture, University of Kentucky, is on a year's leave of absence to engage in graduate studies leading to the Ph.D. degree at the University of Chicago.

James O. Bray of the Department of Agricultural Economics, Purdue University, has been awarded a Sears Roebuck Fellowship in Agricultural Economics at the University of Chicago, where he will undertake graduate studies toward his doctorate.

Robert J. Byrne, who was associated with the Traffic Department of Cities Service Oil Company, Chicago, Ill., has joined the staff of the Transportation Section of the Cooperative Research and Service Division, Farm Credit Administration.

W. Edwin Christian, Jr., who has been pursuing graduate study at the University of Chicago for the past year and a half, has been appointed Associate Professor of Marketing, in the Department of Agricultural Economics, at Mississippi State College, and will begin his teaching and research work January 1, 1949.

William E. Christian, who has been doing graduate work at the University of Chicago, joined the staff of Agricultural Economics and Rural Sociology at Mississippi State College, January 1. He has the rank of associate professor and will devote his time to teaching and research in the field of marketing.

Frederick A. Coffey was recently appointed to the staff of the Bureau of Agricultural Economics and was assigned to the Prices Paid Section of Agricultural Estimates. Dr. Coffey, who recently completed a tour of duty in South America, transferred to the Bureau from the Institute of Inter-American Affairs.

Martin R. Cooper of the Bureau of Agricultural Economics was a member of a Farm Machinery Mission of the Economic Cooperation Adminis-

tration which was sent to Europe, Asia, and Africa to study the needs of the several Marshall Plan nations for farm machinery. M. A. Sharp, University of Tennessee, headed the Mission and other members were Tom C. Allington, farmer of Suno, Nebraska; Basil W. Berg, Department of Commerce; Willard Monson, Industry Division of ECA; R. B. Gray, Bureau of Plant Industry, Soils, and Agricultural Engineering; and Montell E. Ogden, Office of Foreign Agricultural Relations. The group left in October and returned to this country the middle of December.

Ivan L. Corbridge, who has been doing graduate work at the University of Chicago, is joining the faculty of the Department ofAgricultural Economics at the State College of Washington, Pullman, Washington beginning January 1, 1949.

Bascom K. Doyle joined the staff of the Department of Agricultural Economics and Rural Sociology at Mississippi State College on September 1 as assistant professor. His work will be in marketing. He was formerly in the Department of Agricultural Economics at Louisiana State University.

Miss Margaret I. Dunbabin has joined the staff of the Agricultural Prices Support Board in Ottawa and will be associated with the staff of the Agricultural Economics Division, Department of Agriculture in research work for the Board. Miss Dunbabin was recently employed in economic research by the Farmer's Union in London, England.

William A. Faught joined the staff of the Department of Agricultural Economics and Rural Sociology at Mississippi State College, September 1, as regional project leader for the Cotton Marketing Project. He was formerly with the Federal Reserve Bank of Dallas.

Paul J. Findlen, who since May 1942 has been fruit and vegetable marketing economist in the Division of Agricultural Economics, Federal Extension Service, has accepted appointment as program review officer to the Economic Cooperation Administration mission to Ireland. Dr. Findlen left Washington for Dublin on November 23.

R. K. Froker was appointed Dean of the Wisconsin College of Agriculture and Director of the Agricultural Experiment Station and of Agricultural Extension on October 16, 1948 to succeed Dean Ira Baldwin who was promoted to the Vice-Presidency of the University.

James P. Gaines, formerly at Louisiana State University, joined the staff of the Department of Agricultural Economics and Rural Sociology at Mississippi State College, January 1 as assistant professor. He will do full-time research in farm mechanization.

D. J. Gillis, Director of Agriculture for Newfoundland was in Ottawa recently to confer with agricultural officials, including those of the Agricultural Economics Division, with reference to the extension of services to Newfoundland when that colony becomes the tenth province of Canada in 1949.

Gertrude Gronbech has returned to the Bureau of Agricultural Economics and is on the staff of the Division of Statistical and Historical Research. She spent the last year with the Danish Agricultural Council in Copenhagen.

Herschel N. Hadley has transferred from the Office of the State Statistician in Seattle to the Washington Office of the Bureau of Agricultural Economics. He is working with prices paid by farmers for services.

I. Keith Harrison has returned to the Bureau of Agricultural Economics

after two years of work in the Bureau of the Census on the 1945 Census of Agriculture. He is assigned to the Section of Farm Costs and Returns of the Division of Farm Management and Costs.

Carl P. Heisig, Head of the Division of Farm Management and Costs, Bureau of Agricultural Economics, visited the principal agricultural areas of Brazil, in his capacity as adviser on agriculture to the United Section of the Joint Brazil-United States Technical Commission which convened in Rio de Janeiro early in September. Mr. Heisig returned to the Bureau early in December.

Walter A. Hendricks returned to the Bureau of Agricultural Economics from Germany late in October. While there he completed the analysis of yield data on rye, wheat, and potatoes collected by objective measurements during the summer. He also made an objective check of the land utilization census.

Clifford G. Hildreth of Iowa State College is joining the faculty of the University of Chicago as of January 1, 1949, where he will carry forward researches in agricultural economics and in the Cowles Commission jointly.

Jimmye S. Hillman, who has been teaching in the Department of Agricultural Economics and Rural Sociology at Mississippi State College, is on leave this year for graduate study at the University of California.

Asher Hobson of the University of Wisconsin who has been on leave of absence for a year during which time he travelled through Many of the European countries will return to the Department February 1, 1949.

George E. Hodsdon, after a brief stay in the Poultry Section, Cooperative Research and Service Division, Farm Credit Administration, was recalled by the Air Force to serve as major with the 1st Airlift Task Force in Germany.

Donald C. Horton of the Division of Agricultural Finance, Bureau of Agricultural Economics, is teaching a course in the Economics of Agriculture at American University during the second semester.

W. E. A. Husmann, professor of agricultural economics at Clemson College, was recently qualified as an "accredited" farm manager and appraiser by the American Society of Farm Managers and Rural Appraisers.

Roy B. Johnson has accepted a position as assistant statistician in the office of the State Statistician at Gulfport, Mississippi. Mr. Johnson was formerly research associate in agricultural economics at the Louisiana State University.

Lawrence A. Jones, who for the last year has been doing research in farm mortgage distress for the National Bureau of Economic Research, has returned to the Short-term Credit Section of the Division of Agricultural Finance, Bureau of Agricultural Economics.

Harold F. Kaufman joined the staff of the Department of Agricultural Economics and Rural Sociology at Mississippi State College, July 1, as professor of rural sociology and coordinator of the rural sociology work in the college. He will do teaching, extension and research in rural sociology

Edward E. Kern and Warner L. Bruner, formerly graduate assistants, have accepted appointments as research associates in the Department of Agricultural Economics at the University of Louisiana.

Ben T. Lanham, Jr., is accepting a position in the Department of Agricultural Economics at Alabama Polytechnic Institute as economist. He is returning to the department after a year spent in operating the home plantation in South Carolina.

Alvin T. M. Lee, formerly with the Bureau of Agricultural Economics, has transferred to the Agricultural Division of the Bureau of the Census. He is working primarily on economic classification of farms in the 1950 Census.

J. N. Lewis, agricultural economist, Canadian Department of Agriculture, who for the past five years was associated with the work of the Combined Food Board and the International Emergency Food Council in Washington, has returned to his position in Ottawa.

D. A. B. Marshall, agricultural economist of the Economics Division, Department of Agriculture, and Editor of the Division's publication "Agriculture Abroad" has resigned to accept a position as agricultural trade commissioner in the Department of Trade and Commerce.

E. H. Matzen, formerly associate professor in agricultural economics at the University of Missouri, has joined the staff of the Cooperative Research and Service Division, Farm Credit Administration, to work in the field of cooperative dairy marketing.

D. G. Miley, head of the Department of Agricultural Economics and Rural Sociology, Mississippi State College, was transferred to Superintendent of the Delta Branch Experiment Station, Stoneville, Mississippi, September 1, 1948.

Kenneth A. Monson has been appointed fieldman in farm management at the South Dakota State College of Agriculture.

Howard W. Ottoson was appointed to an instructorship in farm management at the Iowa State College beginning January 1949.

H. L. Patterson, formerly in charge of the Dominion Economics Division office at the University of Manitoba, has resigned to become Director of Cost Studies for the Department of Agriculture of Ontario with headquarters at Toronto.

Harald A. Pedersen, formerly in graduate study in the University of Wisconsin, joined the staff of the Department of Agricultural Economics and Rural Sociology at Mississippi State College, September 1, as assistant professor of rural sociology. He will divide his time between teaching and research in this field.

Raymond J. Penn was appointed chairman of the Department of Agricultural Economics at Wisconsin to succeed Dean Froker who held the chairmanship during the past year.

A. Lionel Perry is returning to the University of Maine as assistant agricultural economist in marketing, February 1, 1949. He has been pursuing work for a doctor's degree at the University of Missouri.

Byron S. Peterson transferred from the Office of the State Statistician in St. Paul to the Washington office of the Bureau of Agricultural Economics. He is currently working with prices received by farmers.

Stanley J. Provost has joined the staff of the Division of Farm Management and Costs of the Bureau of Agricultural Economics and has been assigned to the Costs and Returns Section.

E. P. Reid and G. P. Boucher, agricultural economists of the Economics Division, Canadian Department of Agriculture, who have been engaged in graduate studies at the Universities of Wisconsin and Minnesota respectively, have returned to Ottawa to resume their work with the Economics Division there.

Arthur Roth, Jr., has been appointed to the Western Agriculture Section, Division of Farm Management and Costs, Bureau of Agricultural Economics. He is stationed at Bozeman, Montana, where he is working on adjust-

ments, costs and returns of cattle and sheep ranches in cooperation with the Montana State College of Agriculture.

Charles F. Sarle of the Bureau of Agricultural Economics is due to return from Japan about the middle of January. His assignment with the Army in Japan involved the expanded use of objective samples for estimating crop production.

Douglas F. Schepmoes has joined the Land Economics staff of the Bureau of Agricultural Economics and is stationed in Washington, D. C.

J. M. Stepp, professor of agricultural economics at Clemson College, has completed a survey of postwar industrial development in four states for the National Planning Association.

Arthur W. Van Dyke has been appointed assistant professor of agricultural economics at the University of Connecticut in the field of extension marketing of fruits and vegetables. Previous to this appointment, he was at Cornell University where he worked with farm labor associations on problems of business management.

Don Swartz has joined the staff of the Dairy Section, Cooperative Research and Service Division, Farm Credit Administration. Before joining the Division, he worked as an economist with the Michigan Milk Producers Association, Detroit, Michigan.

Otis T. Weaver returned to the Cooperative Research and Service Division, Farm Credit Administration in October following several years with the Tennessee Valley Authority and a more recent assignment with the Military Government in Korea as executive secretary, National Economic Board.

O. V. Wells, Chief of the Bureau of Agricultural Economics, has accepted a summer session appointment on the staff of the Department of Agricultural Economics, University of Wisconsin, beginning June 27, 1949. Professor Wells will give two courses—one on "Agricultural Policy" and the other in the general field of research in agricultural economics.

E. C. Young, Dean of the Graduate School at Purdue University, returned to Purdue University February 1 to assume his duties as Dean of the Graduate School, after a year's leave of absence to direct a study of milk marketing for the New York State Commission of Agriculture. Dean Young is commuting, part time, to New York City to complete the study.

The Bureau of Agricultural Economics lost one of its outstanding State statisticians November 18, when Andrew J. Surratt, head of the Federal-State Crop Reporting office at Springfield, Illinois, died in an automobile accident near St. James, Missouri. Mrs. Surratt, who was in the car driven by her husband when it overturned, suffered slight injuries. The two were en route to Oklahoma to spend Thanksgiving with their daughter.

Mr. Surratt, just past 67, was the dean of active State statisticians. He had been with the Department of Agriculture since 1913 and would have retired within 3 years. He first served as agricultural statistician in the Dakotas with headquarters at Aberdeen, S. D., transferring to Illinois in 1922. He was chairman of the Illinois Corn Hog Board of Review, AAA, USDA ('33–'35) and a member of the Federal-State Drought Relief Commission for Illinois in '34 and '36. He was an elder in the Presbyterian church, a Mason, and a member of the American Farm Economics Association, the American Soybean Association, and of the Mid-Day Luncheon Club, Springfield, Illinois.

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FARM ECONOMICS

PROCEEDINGS
NUMBER

THE AMERICAN FARM ECONOMIC ASSOCIATION
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THE AMERICAN FARM ECONOMIC ASSOCIATION

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AGRICULTURE IN A STABILIZED ECONOMY*

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Council of Economic Advisers

NEAR the close of 1945 Professor T. W. Schultz presented a study, "Agriculture in an Unstable Economy" under the auspices of the Committee for Economic Development. This study was designed to bring the methods of economic analysis to the shaping of public and private agricultural policy.

Schultz's concern was primarily with the low incomes received by farm families periodically—or even perennially except for the temporarily enhanced demands of wartime. The fickleness of the weather, the recurrence of military conflict, and the fluctuations of business (basically heavy industry) were cited as the three sources of instability against which agriculture must contend. Although Schultz clearly set forth the "stabilization of the industrial-urban economy at high production and employment" as the "first line of defense" for satisfactory farm income, his book was primarily concerned with the second line of defense, or such changes in institutions and practices as would operate to offset the forces of rural instability. On the basis of his diagnosis, he prescribed compensatory payments as a specific remedy though forward pricing to farmers provide a broad base for his total therapy.

It is no part of my present task to analyze the *modus operandi* or the practical efficacy of this remedy in a world which continued to suffer in future the vicissitudes of weather, of war, and of industrial curtailment such as we have experienced in the past. The certainty of weather changes and the uncertainty of avoiding war give sound reasons for us to direct searching attention to both governmental and private means (such as better farm management and coopera-

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

tive organization) for offsetting the market disturbances that result from surplus and scarcity.

But the third factor of instability is not similarly to be taken for granted or dealt with merely through some scheme of affecting manipulations of market supplies or of private incomes. The country has now undertaken to do something positive about business depression. Only a few months after the appearance of Professor Schultz's book, the Employment Act of 1946 undertook to create within our frame of government such agencies both executive and legislative as would promote a more stable total economy.

The Employment Act of 1946 launches a frontal attack on the problem of stabilizing American industry at a high level of employment and production, that is, promoting sustained use of our resources, natural, human, and financial. Any reasonable degree of success toward reaching that goal would make a substantial contribution toward the stabilization of agriculture by providing a sustained market for farm products. The national legislation under which I have the honor to hold office proposes to deal with this aspect of unsatisfactory rural purchasing power by the fundamental methods of restoring economic health rather than merely easing the pain of economic illness.

This undertaking, however, is not a one-way street. The industrial sector of the economy can suffer unstabilizing jolts from a badly managed or incorrectly directed agriculture quite as truly as agriculture can be rocked by industrial disturbances. Thus, there must be a simultaneous, coordinated adjustment of agriculture and industry, including their commercial, financial, and communication ancillaries, if we are to achieve a practicably stabilized economy. In my title "Agriculture in a Stabilized Economy," I have attempted to suggest the importance for agricultural thinking that this development of a national program of economic stabilization carries. But if my title were to describe properly the points I wish to discuss with my fellow agricultural economists, it should be expanded to read: "Agriculture's Contribution to a Stabilized Economy" or "Agriculture's Responsibility in the Stabilization of the Economy." As agricultural economists, we must do more than explore the question: Can agriculture's problem of low and unstable income be solved, at least in substantial part, through practicable measures for the stabilization of high industrial employment or through monetary and fiscal measures? We are challenged with the corollary question: "How can agriculture be so organized and

farmers so conduct their business affairs that agriculture as a basic industry shall itself make the maximum positive contribution to the stabilization of the economy as a whole?"

The Council and its staff are exploring our task of bringing professional economics to bear on the continuous analysis of causes of instability and the recommendation of public policies that would lead toward high-level stability. This focuses our attention on the nature of the price system (including factor shares) through which, with major reliance on the devices of an open market, a free people can continuously keep themselves at work efficiently as well as diligently up to that point where the various workers prefer leisure to more goods. This brings us face to face with the question whether we, as economists and businessmen, workers, bankers, and farmers in fact understand the nature of the relationships between prices, wages, costs, and profits well enough so that we can make our myriad operative decisions in such a way that they will add up to sustained prosperity or high-level use of resources.

It is very easy for us to talk about "maladjustments" in the system or about "factors of instability," about the "disparity" between movements of economic factors that we conceive to be causally related, or about "the development of imbalance in the economic structure." But when we come right down to it, how much do any of us know as to what constitutes balance, what are the kinds of relationship that are essential to dynamic stability? We are impressed in our Council work with the fact that both economic theory and business practices will require a great deal of re-thinking if we are to make even measurable progress toward the attainment of the purposes set forth in the Employment Act.[1]

[1] I am disposed to reiterate in this connection the view I expressed in January 1943:

"Economists of my generation were brought up in the tradition of the 'price-organized society' or 'exchange cooperation,' in a preponderantly *laissez-faire* setting. We have lived—I trust not beyond our time—to experience the realities of a society whose economic life is by no means ordered by mere behavioristic responses to free-running market influences. Perhaps our economic system today cannot be regarded as predominantly characterized by determinations even nominally based on free market prices. Not only may the government, through many of its agencies, set or significantly modify a rate or price; large industrial or mercantile corporations, banker affiliations, cooperative associations, labor unions may also inject similar fixations of exchange ratios into the stream of economic life, leaving the affected parties to adjust their operations to the resultant situations as best they may. Or these administrative agencies—public or private—may decide autocratically to turn whole blocks of given resources into the stream of production or trade at specific places places or to withhold them. In this event, the price system must absorb the impact of these centralized determinations of volume as best it can.

"No longer is the economics of individualism adequate to the problems of large

This is hardly the place or time for an extended and detailed discussion of those objectives. Some steps in this direction have been taken in the Annual Reports of the Council of Economic Advisers and in the Economic Reports of the President. My main point is that we still need to do a lot of re-thinking of our economics if we are to set up appropriate and attainable goals for the American economy. The goal of "maximum employment, production, and purchasing power" calls for more than stability as such. It calls for the full and sustained use of our economic resources. It calls for a continuous and increasing flow of goods and services to all our people. It calls for economic progress, not economic stagnation. It calls for prices and incomes that are so adjusted that they will help guide our economy toward a steadily rising standard of living.

In all fairness, I think it can be said that this process of re-thinking began earlier and has been systematized and carried farther in agriculture than in either of the other major sectors of the economy, namely organized labor and what we are pleased to call business, industry, or management. I believe also that agricultural economists are coming to realize more and more the futility of agricultural goals, policies, and programs that are developed in isolation and that are not properly coordinated with the goals, policies, and programs for labor and industry.

Agriculture was the most inherently individualistic major occupation and thus could (even though it used the cooperative association) do relatively little to grapple with its problems through the methods of organization turned to by the business corporation and the labor union. Thus, it jumped over the stage of piecemeal private solutions and came directly to broad issues of economic principle and public policy in relation to the industry as a whole.

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and rigid business groups and government participation in business. I think it is not fantastic to suggest that the economic phenomena of corporate, union, and government price administration and large-scale decision of action or of obstruction (including financial controls) move us from the phenomena of the endlessly tossing but perpetually leveling ocean (to use Edgeworth's phrase, ripples and 'viscous waves' upon the surface of 'a sluggish sea!') to the phenomena of the towering icepack and the abysmal crevasse.

"Confronted by the problems of such a business world, we economists have ranged ourselves in two schools of thought. One school would apply dynamite to the ice jam or even hope to melt the separate blocks back to their pristine fluidity. The other would accept crystallization as an accomplished fact decreed by Nature; they would seek by skillful engineering and with architectural vision to shape and build those blocks—of varying sizes—into a stable and serviceable structure of business."

"Collective Bargaining and the Common Interest," *American Economic Review*, March 1943 (Presidential address, 55th annual meeting of the American Economic Association, Washington, D. C., Jan. 6, 1943).

The agricultural depression of the 20's led farmers to demand that institutional provisions be made to give them economic protection because individual means and private organizations were inadequate. They argued that the economic demoralization of agriculture undermined the prosperity of the whole economy.

When general depression overtook the country in the 30's, public policy accepted the idea of national support devices for agriculture as a safety measure for the whole economy. The fact of the interdependence of agriculture, labor, and business as the three great sectors of the economy was soundly conceived in the demand for "parity"—although the concept of parity as economic equilibrium was only crudely reflected in the parity formula then devised. Even later attempts at reformulation have sought further to corrupt it about as often as they have really been designed to refine or perfect it. We have during the past three decades seen a considerable growth of outspoken and at times rampant agrarianism in this country. But at the same time, there has been a deeper and, let us hope, stronger undertow of thoughtful analysis toward realization of the fundamental integration of problems of agricultural prosperity with those of total prosperity.

Professor Black put the matter with admirable clarity and force on the eve of World War II in his incisive book *Parity, Parity, Parity.* Taking off from the parity concept formulated in the agrarian struggle of the 20's and 30's, he said:

> Parity for Agriculture alone is impossible, Parity is a balance concept . . . If Agriculture gets more than its share and tips the scales downward in its favor, then the rest of society must get less than before. . . . Three parities must be considered—Parity for Agriculture, Parity for Labor, and Parity for Capital.
>
> The term Parity was brought into the discussion by Agriculture. But Labor has *thought* parity ever since there have been free men. In this country it has thought it with increasing intensity since the turn of the century. In concrete terms, the issue for Labor has been higher wages, shorter hours, and better working conditions. In more general terms, Labor has been fighting for a *larger share of the REAL income of society* . . . .
>
> Capital also has had its years of discomfiture. They have been periodic, with every business recession. The recessions in 1893, 1907, 1914, and 1921 developed into major depressions. But the spokesmen for Capital have never made the mistake of asking for a larger share of the national income. . . . Capital had other ways of looking after its income share, but they did not keep depressions from recurring. The scales still tip steeply against Capital in every recession.
>
> Three Parities though there be, it has remained for Agriculture to make us conscious of it. Labor and Capital fought out their differences in their

own way, leaving Agriculture pretty much a bystander. Now Agriculture has barged into the fight, sparring first with one and then with the other. And the public looks on somewhat in amazement, and somewhat in bewilderment.[2]

There have, of course, form time to time been proposals of alliance such as the Farmer-Labor movement. That proposal foundered on Labor's sensitivity to high food costs and on the farmer's resentment at effort to unionize farm labor or even at the infiltration of union ideology into the hired man's thinking or because of the competitive pressure of factory wages on farm labor costs. There have also been efforts to emphasize the capitalist alignment of the modern farmer, and schism has arisen between capitalist farming and subsistence farming or agriculture as a "way of life," not a business. But with the declaration of national policy made in the Employment Act of 1946, the way has been opened for approaching the reconcilement of the interests. It now devolves upon us to learn how to compute the common denominator of maximum national production which will give each of the three factors—labor, capitalist industry, and the farmer—maximum real purchasing power.

Business, in its approach to this problem, is disposed to claim that it is the role of management to reconcile the rival claims of labor, capital, and the consumer. Businessmen have expounded a rationale which stresses the importance of company earnings large enough to replace capital equipment as it wears out, to modernize plant in step with advancing technology, and to expand it in anticipation both of population growth and of vigorously rising standards of living. Top business organizations express concern for the welfare of agriculture but are critical of agricultural supports which tend to deprive the consumer and industrial users of the benefit of large crops while they permit the farmer to reap the full benefit of any period of relatively short supply. This is particularly true when market demand is stimulated by foreign aid or other governmental or tax-fed purchases. Business lays great stress on the self-defeating character of wage advances driven through at times when there is no increase in labor productivity—which assumes that wages at whatever time is taken as base were correctly adjusted or in economic balance. Whatever the merits of mangements' claim that it sees the economic picture in its entirety, we can hardly be content with unilateral determination of controverted issues. Only if each of the three interest groups is satisfied that it is being recompensed

[2] Black, John D., *Parity, Parity, Parity*, pp. 1, 2.

in proportion to its productive contribution will it put forth the effort needed to achieve the maximum total.

Labor's attitude toward economic adjustment is not, like capital's, defensive of a favorable position already enjoyed. It is a strategy of aggressive action to better a position regarded as unsatisfactory. Professor Black says: "Labor has *thought* parity ever since there have been free men." That takes in a lot of territory. I gravely doubt that the record would bear out this characterization of labor policy over the important organization period of the last sixty years. Mr. Gompers' formula was essentially: "Build up all the group strength we can, and then *get ours now*." The only way I can recognize craft union policy as one of seeking parity of return would be on the ground that labor took it as an axiom that the worker's return was always and everywhere too low for a true economic balance. The craft union school of labor strategy did not direct itself toward making an objective econometric demonstration of the respective amounts of this disparity for the several labor groups. Nor, in my observation, would John L. Lewis or James Cesare Petrillo have any understanding of or patience with such an approach.

Present union policy-making as a whole, however, has turned to the tools of economic analysis and statistical measurement to relate wage bargaining to such a concept of economically rationalized returns. Frequently they have drawn up economic briefs in support of their claims which certainly justify Black's assertion, if changed to the present tense. Much of organized labor today *is thinking* economic parity. A very capable consultative committee of CIO executives and economists which sits around our Council table periodically has ably explored this approach. It has memorialized us and the President with documents urging the calling of tripartite conferences in which the interrelated adjustments of labor, management, and agriculture should be systematically analyzed, to the end that a body of economic adjustment principles might in due time be evolved.

The labor spokesmen have started from certain conclusions as to the disparity between industrial returns (called "the greatest profits in history") and labor wages. These conclusions may not be universally agreed to even though the unions offer supporting data and analysis. But the point is that they urged that "the President through his Council of Economic Advisers should convene all groups immediately to establish an agreed upon

program which all management, labor, and agriculture will pursue."[3] The immediate issue was stated as the halting of current inflation. A second objective was to agree in advance on the principles which should be followed and the devices which should be employed to prevent recession (if and when it comes) from progressing into a vicious downward spiral of mutually destructive liquidation or bringing the economy to a dead center of chronic stagnation far below the productive level of available resources. Third, and most important of all, they put the question: "What do we do to build and maintain on a long-term basis a permanent full-employment and full-production economy?"

The Council has by no means brushed off this thoughtfully advanced proposal. Rather have we asked: How many labor representatives can you send who will be prepared objectively to consider and technically to understand the complex issues involved in the functioning of a total economy on a stabilized basis of high production? Will these representatives be willing to stay in session as long as needed to arrive at truly workable solutions, and will they be prepared to make such concessions on behalf of labor as are necessary to get an initial formulation and a progressive method for testing those principles in operation and to make subsequent adjustments as need for them develops? Will these representatives be given necessary powers of action by their constituents, and can they give the other parties reasonable assurances of compliance with the arrangements arrived at?

Our labor friends recognize the seriousness of these obstacles. So do representatives of agriculture and of business with whom also we have discussed the possibility of such a tripartite economic principle and policy conference. In all modesty the Council has had to say on behalf of the economics profession: "We are not yet properly equipped to give the technical guidance which such a conference would need. No one yet has a profound enough knowledge of the infinitely complex system of economic forces and human (largely

[3] *Statement on the General Price Situation* by Emil Rieve, Administrative Chairman, CIO Full Employment Committee, Aug. 12, 1947, and similar suggestions in *Statement of the CIO Full Employment Committee to the Council of Economic Advisers*, June 7, 1948.

Only last week a like proposal was advanced by William Green, president of the A.F.L. In his Labor Day address, at Akron, Ohio, he said: "The American Federation of Labor calls upon our Government to request business and agriculture to join with organized labor in conferences to protect the economic security of our country. . . . The free enterprise system has proved in the past to be far superior to any other. But free enterprise does not mean anarchy, nor a policy of the devil take the hindmost. It must operate for the benefit of all the people, not only a favored few at the top."

institutionalized group) behavior which determines the functioning of our modern industrial economy to have sure answers."

But quite possibly the best way to move ourselves toward such understanding is to combine the experimental method with our other tools of study such as theoretical and statistical analysis. If, after carefully considered formulation of the issues and marshalling of our respective economic analyses, we of agriculture, of industry and of labor were all to meet in a working assembly charged with the task of synthesizing a comprehensive program of practical adjustment, we might all learn more in the process than from any other available procedure. The real question is whether in the last analysis we have the will to succeed, whether each of the several interests is willing to submit to the self-discipline necessary to hammer out an answer by the methods of science rather than trying to force a differential advantage for itself through the methods of group warfare.

A year ago, Professor Schultz committed himself to the pessimistic conclusion that we do not have such a will to succeed. He said:

"The United States is not prepared to keep its economy at full production. Neither among the people nor from representatives of agriculture, labor, and business has there emerged a conception of full production that is valid. Instead, thus far, for the most part, we have been making politics and not policies to deal with this matter. The conditions necessary to achieve this important objective are not understood. We are blocked by a bundle of mistaken beliefs. We are in conflict as to the more ultimate ends. . . . Each group is prone to define full production to fit its own interest, with a profound indifference to the general welfare. One group's definition can lead only to inflation, another's to deflation; one view could give stagnation, another economic instability.

"Higher support prices for farm products, higher corporate profits for business, and higher wage rates are not the stuff out of which full production is made. The criteria for full production are not to be found in the folklore of any special interest group. We need an objective standard. One that is free from social biases, free from hidden political purposes. We need a standard that can be described, identified and tested. It should not be an instrument of special pleading, of propaganda to beat down labor, or on the other hand to price labor even higher."[4]

I am afraid that as a literal statement, Schultz is right. The United States is not *today* prepared really to *achieve* the stabilization of its economy at a high level of production. But I am un-

[4] Theodore W. Schultz, "The Economic Challenge that Comes with Full Production," Third National Forum of Agriculture, Labor, and Industry, University of Wyoming, Laramie, July 28, 1947.

willing to admit that this country is not ready to *begin the process* of showing that it has the economic sophistication and the self-discipline to *work out* the private and public adjustments through which this objective can be reasonably well attained under a system of private business enterprise and representative government action.

I do not know whether a national economic conference of the proposed sort will ever be called. But we as economists, if we are to give a good account of our professional stewardship, should be ready if and when it comes. While the active cooperation of businessmen, bankers, workers, farmers, and consumers must be had if suitable goals are to be set up and in due time reached, the economist has very important functions to perform. First, he must work with the technical production experts to determine what patterns of production and consumption are feasible with the resources we have or with the resources we can develop. Second, he must determine what price, income and profit patterns are consistent with each of these patterns of production and consumption. Third, he must gather, analyze, and present any material that will help the public decide what shifts in production and distribution would be beneficial. Fourth, he must rigorously test the soundness of policies and programs that are proposed to bring about these adjustments.

Besides providing the factual and analytical materials on which goals should be set and adjustments based, the profession should supply some well-trained, tough-minded, and fearlessly honest economists to serve on the staffs of business, labor, and agricultural organizations. We should help to broaden the economic education of those who serve as leaders of organizations in all these fields. So far as possible, we should also promote elementary economic education among the rank and file so that they will choose the right kind of leaders and be willing to follow sound leadership when matters come to the issue.

Again let me say that we in agriculture are fortunate in the long growth of popular scientific education through the agricultural colleges, experiment stations, and extension service and through the agricultural high schools and boys and girls clubs. In the past generation remarkable progress has been made toward bringing about a better general understanding of agricultural economics. Labor appears to be on the threshold of a somewhat similar development, and management is expanding educational agencies that range all the way from arrant propaganda to the scholarly but practical research studies and policy statements that emanate

from the C.E.D. Enlargement and improvement of these efforts are needed if economic adjustments of truly stabilizing character are to be achieved.

As for agriculture, in recent years the U. S. Department of Agriculture and the agricultural colleges have had some very interesting and useful experience in setting up goals for agricultural production crop by crop and State by State and in working out programs consistent with these goals. I hope this work will not only continue but will be strengthened and will be coordinated with the development of goals for the rest of the economy.

Two other recent developments seem to me to be in line with the kind of research and educational program I have been discussing. One of these is the work of the Postwar Agricultural Policy Committee of the Association of Land Grant Colleges and Universities. Their studies and the report issued in 1944 included a broad survey of postwar objectives of agriculture in sound functional relation to the whole economy, and proposed policies and programs for reaching them. In the words of its authors it was "prepared with the purpose of advancing the welfare of all of the people of this nation by making constructive suggestions for a sound agricultural policy."[5]

The other development I have in mind is the essay contest conducted by this association in 1945 to bring forward new proposals for programs to support agricultural prices and to stimulate a wide discussion of such proposals. Activities like these are concrete examples of the kinds of study and educational work needed in agriculture. In view of subsequent developments it may be suggested that it would have been more serviceable if the thought of our most able and ingenious economists had at that time been directed not to support measures but to consideration of the problem of what measures could be devised to prevent a rather moderate agricultural shortage from having such profound inflationary consequences as those of the latter half of 1947 and of 1948.

Farmers fortuitously became a major factor in a profound and rather pernicious inflationary sequence. It will not do simply to say they were innocent or passive beneficiaries of the phenomenon so inimical to the health of the economic process as a whole. Did they do anything to lessen the harmful impact on the economy of the adventitious benefits they were receiving or to remove or lower any

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[5] *Report of the Committee on Postwar Agricultural Policy of the Association of Land Grant Colleges and Universities*, October 1944, p. 3.

of the artificial props to their favored position? No. Cotton and wool farmers have been as ready to hold up the country as the most predatory of the trusts or the most ruthless of the unions. The dairy co-ops reputedly spent a large sum to lobby for the retention of legislation designed to keep butter prices high by denying access to a wholesome alternative product. Tobacco growers intervened actively to get parity formulas that permitted selection of a different base period and, later, a choice among three bases so that everyone could get some price enhancement even when tobacco prices were already high.

It may be easier for the agricultural economist—and he no doubt gets a better welcome—when he comes forward with proposals of support than with proposals of restraint or the foregoing of windfall gains. But true economic stabilization requires the dampening of boom influences quite as much as it does the bolstering of a collapse. Presumably if the former is done competently, need for the latter would not arise. If in some measure we fell short of the stabilization service we might have rendered in 1947 or '48, we should be all the more determined to be tough-minded and fearless in dealing with the agricultural adjustment problems of 1949 and 1950.

There will be a grave testing time for agricultural adjustment principles in the years just ahead. Agricultural statesmanship must ease the farm industry down from its wartime stilts. Agricultural economists must show both vigor and objectivity in their thinking if they are to point the way to adjustments that will produce a reasonable level of remuneration for the larger number of men and of acres rather than the highest possible level of return for fewer acres and fewer men; that will promote optimum mechanization in both scale and rate, not mere maximum mechanization and possible overcapitalization; that will effect the kinds of labor-saving that make high general nutrition possible rather than forcing unemployment; and pricing that will keep farm plant in use and preserve farm job opportunities rather than pricing the farmer out of his normal market and accelerate the use of synthetics and other substitute materials.

We need the kind of agricultural policy that will contribute to well rounded national prosperity. The agencies of education in agricultural and national economics must blaze the path to such policies if agriculture is to contribute properly to the stabilization of the economy and on that basis have its own real income stabilized on a high level.

AGRICULTURAL POLICY*

Chairman: O. B. Jesness, University of Minnesota

RUDOLPH K. FROKER
University of Wisconsin

FOR my opening statement on this panel I shall compare briefly the agricultural act of 1948 with the principal recommendations of the committee which reported here a year ago on "Redefinition of Parity Price and Parity Income."

The American Farm Economic Association committee placed its main emphasis upon parity income for farmers as a group rather than parity prices for individual farm commodities. Some may contend that the new act is in complete variance with last year's report. Such is not the case.

The committee made several suggestions for revising parity prices but preferred the income approach over the price and commodity approach. Let me quote a paragraph from that report:

"If the only alternatives were retention of the present parity-price formula or modification of it, we would certainly favor the latter. In such modification we would employ not only a moving base period for determining the relationship among parity prices of the respective agricultural commodities, but also a shifting base period for the parity-price index itself. Its base period would be the most recent normal peacetime period in which national production and employment were at high levels. Together with this change we would favor the inclusion in the index of farm wage rates, weighted exclusively on the basis of expenditures for hired farm labor. Periodic revision should be made of the weights assigned to the various items in the index; the current parity prices of crops should reflect departures in national yield per acre from the average of the preceding ten years."

In the hearing records developed preliminary to enactment of the 1948 legislation there is evidence that some of the sponsors including Senator Aitkin were thinking in terms of both income and prices. By adjusting the support price inversely with the size of the crop the new act seeks to stabilize farm income from year to year for each of the basic commodities. Your committee placed its emphasis upon maintaining the per capita farm income in line with nonfarm incomes.

* Five-minute papers presented at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 13, 1948.

The flexible price support provisions of the new act are probably its most distinctive feature and correct some of the undesirable provisions of the earlier legislation. It is to be noted, however, that adjustments in prices may come slowly under the new act, since the new parity cannot be adjusted downward more than 5 percent per year under the old formula. It may, therefore, be several years before some of the farm commodities are brought into balance.

The new act provides for prices being determined on the free market so long as the prices do not fall below the support level. The committee's proposal called for free market prices regardless of the level. Unless the market is allowed to operate freely throughout the price range, it cannot serve fully the important function of directing consumption and production until they balance and the market is cleared.

The methods by which prices may be supported under the new act include: (1) government purchases; (2) loans and (3) direct payments to farmers. The committee favored direct payments to farmers over the other two methods when used purely for the purpose of enhancing farm prices and farm income. It obviously was not opposed to purchases by the government for specific purposes other than mere price support. In fact, the committee recommended enlargement of nutritional programs such as the school lunch program.

The committee favored graduating the income payments downward as the size of the farm operations rise. In this way it favored the small operator and the family farm. It also favored linking, although not combining, soil conservation and farm income programs. I do not believe there is any such provision in the new act. When the price of a commodity is supported in the market place some very sizable benefits accrue to large operators. Under the present support prices for potatoes the benefits to each of the largest growers run up to several hundred thousand dollars. This situation has become the basis for much public comment.

By supporting prices above competitive levels the new act is likely to lead to production control, to multiple price plans and to continued subsidized exports. The committee sought to avoid these measures by letting prices find their competitive level and making additional payments when necessary, direct to farmers.

The total cost to consumers and the public under the new act will be difficult to determine while the payments under the com-

mittee's proposal would have been out in the open and easily determined. This is an advantage or disadvantage depending on your point of view.

T. K. COWDEN
American Farm Bureau Federation

Five points will be raised:

1. *The importance of having agricultural policies consistent with our international aims*—Peace is the most important problem facing not only the American farmer but also the entire world. Care must be exercised to see that agricultural policies are consistent with international policies. If the United States is to fulfill its world obligations and our citizens to receive proper benefit from world leadership, we will have to trade with other nations. Trade means we must import as well as export. There is a real education program to be done in this field. My respect for the work and responsibilities of the Land-Grant colleges has increased rather than decreased as a result of my experiences during the past five years. A sound internati ona policy cannot be developed unless there is widespread understanding by our citizens of the problems involved.
2. *Adding greater stability to the general price level*—This is one of the most important problems facing our economy. It involves many interrelated and complicated factors. Perhaps the best place to start is the establishment of a joint congressional monetary study commission. The congressional commission should use technical experts. Since any action will likely involve congressional approval, steps should be taken now to develop congressional leadership in this field. Present information indicates that we should have a national monetary commission with responsibility for coordinating the various factors in such a manner as to contribute to greater price stability. This involves taxation, the handling of the national debt, the regulation of credit, the backing for the dollar, exchange rates, and factors influencing the general economic stability of the country. Adding greater stability to the general price level offers greater promise than numerous attempts to stabilize prices of individual commodities.
3. *A pricing program for agriculture*—Whether we like it or not there will be some kind of governmental pricing program for

agricultural products. It remains to be seen whether this program will develop into a governmentally-administered price system or a program which will serve during periods of low agricultural prices. The American farmer, especially the commercial family farmer, has much to gain by the maintenance of a relatively free market which will enable the the productive farmer with the know-how and the skills to advance to the best of his ability. There is a real challenge to operate our economy in such a manner that farmers as well as other citizens will not continually turn to government in in the hope of obtaining price relief.

4. *A program of real conservation is needed*—It appears that the technical knowledge in this field exceeds the development of techniques to obtain the application of conservation practices. Since the govenment is likely to spend considerable sums of money for various conservation purposes, it is essential that more thought be given to the techniques of getting the job done. This involves soil conservation, flood control, forestry, public land problems, and related fields. It is commonly stated that although the government owns large acreages of forests, 90 percent of our capacity to grow timber is in the hands of private owners. It is apparent that the government cannot conserve all the resources of the nation. If the job is going to be done, it will have to be done by the man on the land.
5. *A program for southern agriculture*—Per capita income in the southeastern United States is the lowest of any area in this country. Serious consideration should be given to a broad-scale approach to increasing the productivity of this area. This involves industrialization, perhaps the development of power, expanded research in agriculture, and many other things. From the standpoint of public policy, the question might well be raised as to why we spend millions of dollars of public money in the West developing new agricultural areas, and pass up the southeastern United States, especially since much of the West has a cold, severe climate in which very few people live, while the Southeast is a thickly populated area where the climate is at least conducive to lower living costs. May it not be in order to consider a positive development program for southeastern United States?

WALTER P. COTTON
North Carolina State College

REMARKS in this five minute paper are directed toward a desirable policy for improving the productivity of human resources in agriculture. The objective naturally directs the emphasis towards those areas which in the past have had the lowest productivity per worker. In the first half of this decade the average income of the lower 40 percent of agricultural workers was only one-sixth of that of the upper 60 percent and only one-seventh of the average earnings of all industrial workers. Is there a formula which will give parity of income to these three groups?

These low income farm families are scattered throughout the Nation but have their greatest concentration in the South. However, irrespective of area of concentration, such a divergence in income and productivity is contrary to the interest of both the Nation and the low-income communities.

The problem is essentially one of an unbalanced man-land ratio. Pace has not been kept with a movement from an agrarian to a more balanced economy with its diversity of productive enterprises and services.

The primary symptom of this maladjustment is underconsumption of housing, clothing, food, health facilities, education, and a host of services. Contributing causes are lack of capital, high birth rates, lack of skills and low levels of learning; and their resultant underemployment, lack of alternative opportunities, immobility, and low incomes.

The problem involves both those people who remain on farms, and their brothers who leave in search of better opportunities. The productivity of one contributes to the food market supply and demand for industrial goods; and the productivity of the other contributes to industrial goods supplies and the demand for farm products.

For the Nation as a whole it is estimated that only one-half of the farm youth is required for replacements on farms. In the South, if the man-land ratio is to be improved, probably less than half are required.

Relief for the pressure of farm population on agricultural resources lies in three directions. These are:

1. More complete utilization of land resources.
2. Employment of a higher percentage of farm people in manufacturing industries, or related services within the area where they now live.
3. Migration of part of the population from the most congested areas to industrial centers in other parts of the Nation.

The latter method has been most popular historically. But considerable progress in the first two fields has been realized in recent years. For example, in North Carolina the proportion of the gainfully employed that were engaged in agriculture dropped from 53.5 percent in 1920 to 33 percent in 1946. In 1946, employment in manufacturing in North Carolina was 25 percent greater than in 1939. In addition, the manufacturing industries had become considerably more diversified. For the Southeast as a whole, per capita incomes increased from 51 percent of the national average in 1929 to 67 percent in 1947.

In recent years the Catawba Valley of North Carolina, Upper East Tennessee and much of the Tennessee River Valley have become excellent examples of rural industrial communities, in contrast to centralized industry.

There are a number of ways in which national policy may speed up the process of bringing about a better balance in employment and increasing the productivity of agricultural workers in the South. But in the limited time available attention is devoted to one for which there is a great need and which in the past has had too small a part in national agricultural policy.

There is a crying need for vocational guidance and vocational training in both non-agricultural and agricultural fields in the transformation of these areas from an agrarian to a better balanced economy. Using North Carolina again as an example, 80 percent of the high school graduates and drop-outs have no special preparation for employment. Nearly one-half have never attended high school. About one-half of the rural high schools are without vocational agriculture. Less than 10 percent of all high schools in the state have day trade or diversified occupation training, and these are located largely in urban centers. Out-of-school teen age youths are practically without a training program[1]. The production and marketing of human skills is as important as the production and marketing of farm commodities.

Surely increased productivity would result if more workers in

[1] North Carolina Department of Public Instruction.

industry, agriculture, and forestry had higher skills. Certainly, employment opportunities would be greater if such skills and training were developed. Better education would lead to the removal of many of the causes of low income.

Our economic system is based of a flow of industries to resources, goods to markets and workers to industries. The value of migrants to the community to which they go depends upon their skill and training. Therefore, the responsibility for, and the fruits from the vocational training of youth falls as much in the sphere of the areas to which they may go as of the areas from which they come.

Adequate vocational guidance and training of the rural youth of any community is as much a responsibility of the state as the of community, and of the Nation as of the state.

Along with vocational training must come industrial development, the development of a complexity of services and their employment opportunities. These may need to be attended by a further development of natural resources in order to attract industries. An increased standard of minimum wages and other social welfare programs also may be necessary.

But first of all, let us pay respect to the ability, dignity and initiative of the individual by giving him an opportunity to train for filling his economic place in society, whether it be in the field of industry, services, or agriculture.

DAVID L. MACFARLANE
MacDonald College

I SHOULD like to head into this policy discussion at a point where American and Canadian farm policy have some common ground, by which I mean the European Recovery Program.

First, however, because it will provide a useful back-ground, and because the question has been raised specifically by one of the members of the panel, I should like to make a few comments on Canadian wheat policy. The Canadian Government has had through the war and post-war years an explicit policy of maintaining wheat acreage at about pre-war levels. This is sharply in contrast with the expansion policy of the United States—measured in terms of acreage by increasing from 57 million acres in the period 1935–39 to 74 million acres in the crop year just ended. While American wheat exports were abnormally low in the period 1934–38, they have in the past crop year risen to the phenomenal

level of about one-half a billion bushels as wheat or wheat equivalent. The presently proposed International Wheat Agreement indicates clearly that the U.S. will remain a very important exporter of wheat in the next several years. Canadian wheat policy has been criticized on the grounds that Canada had resources with which to expand wheat production to help meet the extremely large world demand of the past four years.

In September 1943 future trading in wheat of the Winnipeg Grain Exchange was suspended. This action, dictated by the Canadian Government, was taken on the grounds that open trading was inconsistent (1) with domestic price control; and (2) with the fact that the government had become the sole exporter of wheat. I am not suggesting that the government in this action was not influenced by some farm organizations which had long advocated the closing of the Winnipeg Exchange. In this connection I might make the observation that, on the whole, Canadian farmers have been more eager than American farmers to avoid pricing the products they produce in a free market.

In 1946 the Canadian government undertook a four year wheat contract with the United Kingdom. This contract provided for the export to the United Kingdom of a large proportion of Canada's exportable wheat at prices varying in accord with conditions which might exist during the years of the contract period. For the 1946 crops the contract price was $1.55 per bushel basis No. 1 Northern, Fort William; in 1947 the same; and in the present crop year $2.00 per bushel. Canadian farmers have actually received prices somewhat higher than those indicated, due to the fact that wheat exported to other countries is priced in terms of prevailing world prices.

In the first two years of the contract over 300 million bushels of wheat were sold by Canada at prices approximately $1.00 less than the corresponding Chicago prices. The extent to which Canadian farmers lost in the operation depends upon the particular assumptions one makes in attempting to assess the effects of the contract. This contribution by Canadian farmers, or rather by the Canadian Government on behalf of Canadian farmers, was made on the grounds that it would aid in securing domestic economic stability and in the recovery of the U.K. The question has frequently been raised whether or not the burden of such contributions should rest on one group of producers as against placing

them on the whole economy which would have resulted had the contributions been made from tax funds.

A Permanent Dollar Shortage?

The European Recovery Program is, in economic terms, a dollar providing program. The question I should like to ask, and a question of major importance to agriculture, is whether or not we are to be faced with a dollar shortage in the years beyond the E.R.P. I shall not analyze this point, but rather indicate that the U.N. Economic Commission for Europe, *The Economist*, (London), and Dean John H. Williams of Harvard University assert with compelling reasons that there are substantial grounds for believing that world trade may be frustrated in the post E.R.P. period by a shortage of dollars.

I ask you to consider what kind of a pattern farm production would take if we are to be faced with a permanent dollar shortage. Certainly Europe would be provided with grounds for a policy of greater self-sufficiency in food, expecially in cereals, than would otherwise occur. The U.K. is already adopting this pattern. Secondly, Europe would feel it necessary to secure from non-dollar areas the largest possible quantity of food and fiber. Again the U.K. has already commenced such policies. Should a post E.R.P. dollar shortage occur, world agriculture would be faced with frustration and depressed conditions. These would only be tempered somewhat by the narrowing gap in the race between prospective population and potential food supply.

While this is a gloomy line to be following at a time when we are greatly troubled by inflationary forces, it is, nevertheless our responsibility to show some concern for the long-run. How could American and Canadian policy be shaped to avoid such a dollar shortage as described above? How can the facilities of the World Bank and the International Monetary Fund be employed to help meet such a contingency? Can we conceive of dollar investments sufficiently large to overcome the difficulties envisaged?

Canada is grateful for the E.R.P. She is, if you wish to put it that way, a recipient of E.R.P. aid. The sales by Canada to U.S. for shipment in the E.R.P. program from 5th May to 30th September of this year were 279 million dollars. This sum has gone some distance toward balancing Canada's difficult dollar position.

More than two-thirds of these E.R.P. funds have been spent on the purchases of farm products.

A corollary of the Canadian dollar difficulty is that Canada is not now making grants or loans of any kind toward the realization of European recovery. Many Canadians disagree with this policy. I number myself among this group. The U.S. State Department and the government of the U.K., disagree with this policy. Why does the Canadian government follow this line? This policy of not assisting in present European recovery measures traces to the particular devices which the Canadian government selected in the attack on its dollar shortage problem. That government has had in the past year, and still has alternatives to its present dollar saving program.

O. C. STINE
Bureau of Agricultural Economics

THE subject of national agricultural policy and parity is too broad and the time too short to outline the field or give much attention to definitions and historical developments. I propose to outline only briefly the legislative developments of parity policy outlines and their present status.

The agricultural adjustment act of 1933 marks the first assumption of *national* responsibility for maintaining an economic balance in our national economy. The declaration of emergency in that act reads in part as follows: "That the present acute economic emergency being *in part* the consequence of a severe and increasing disparity between the prices of agricultural and other commodities, which disparity has largely destroyed the purchasing power of farmers for industrial products, has broken down the orderly exchange of commodities and has seriously impaired the agricultural assets supporting the national credit structure, it is hereby declared that these conditions in the basic industry of agriculture have affected transactions in agricultural commodities with a *national* public interest. . . ."

Following this statement it was declared to be the policy of Congress. . . . "(1) To establish and maintain such balance between the production and consumption of agricultural commodities, and such marketing conditions therefor, as will reestablish prices to farmers at a level that will give agricultural commodities a purchasing power with respect to articles that farmers buy,

equivalent to the purchasing power of agricultural commodities in the base period. . . . (2) To approach such equality of purchasing power by gradual correction of the present inequalities therein at as rapid a rate as is deemed feasible in view of the current consumption demand in domestic and foreign markets. . . . (3) To protect the consumers' interest by readjusting farm production at such level as will not increase the percentage of the consumers' retail expenditures for agricultural commodities above the percentage which was returned to the farmer in the prewar period."

The Soil Conservation and Domestic Allotment Act of 1936 amending the act of 1933, further developed the policy statement in the following language: ". . . this act shall also include, (1) preservation and improvement of soil fertility; (2) promotion of the economic use and conservation of land: (3) diminution of exploitation and wasteful and unscientific use of national soil resources. . . ."

The consumers' interest was reaffirmed in the statement: "That in carrying out the purposes of this section due regard shall be given to the maintenance of a continuous and stable supply of agricultural commodities adequate to meet consumer demand at prices fair to both producers and consumers".

In the acts of 1936 and 1938 we find recognition of income and purchasing power of farmers, in relation to the earnings of those engaged in nonfarm occupations, as an objective and a measure of parity. The provisions for the use of price relations as a parity standard in 1933, the addition of purchasing power of income in 1936, the revision of the definition of income parity in 1938 were progressive steps in developing measures of parity. It has been recognized that it is goods and services rather than dollars that count, however, in our economy money is necessary to command goods and services. It is a matter of exchange relations in the market to obtain equivalent opportunities for the farm operator and his family in terms of living conditions and opportunities for the future.

The "agricultural act of 1948" improves the parity measures by providing for: (1) adjusting price parities to take into account recent trends in supplying and demand conditions among the several farm products, and (2) support measures related to current and prospective demand and gross income. In this act parity income is defined as the gross income necessary to provide the farm operator

and his family with a standard of living equivalent to that afforded persons dependent upon other occupations. The development of this parity standard requires additional statistical data and analysis, the establishment of comparable measures of standards of living in relation to the time and distribution of income. It suggests concern with educational and recreational opportunities as well as with food, clothing and health for farm families.

We are not forgetting the land and the consumer. The natural resources are to be only maintained but also improved, and the needs of consumers are to be met. Parity for agriculture broadly interpreted today means the maintenance of agricultural resources sufficient to meet the agricultural needs of a growing population with a rising standard of living in this country, to support foreign consumers of such products to the extent that they are dependent upon us and return to the farm worker and his family for this service income sufficient to enable him to keep up with his neighbors.

DISCUSSION[1]

The discussion began by being centered around the proposition of agricultural support price. Income parity for farmers as a group rather than parity prices for individual agricultural commodities has been supported by many agricultural economists. Recent legislation provides flexible price supports and corrects some of the undesirable features of the old legislation, although adjustments in prices may be slow in coming since supports under the new parity formula cannot be adjusted downward more than 5 percent per year. Farmers must decide whether they want to have a free market or support prices; they cannot have both. Price supports are needed in times of low prices, but not otherwise. If we are to have price supports in times of low prices, how about price ceilings in times of high prices?

In the development of a system of free enterprise, it is important that the relationship between national and international committments should be taken into consideration. It would seem at present that there is very little possibility of legislating parity incomes for farmers. In using a system of direct payments from the treasury, each individual farmer's income would depend upon his own cash receipts, the larger his volume of production, the larger his total income. Farmers as a general rule do not like direct payments from the treasury. This fact might be a major deterrent for this type of program.

The present program of support legislation is likely to lead to production control, multiple price plans and to continued subsidized exports. These

[1] Summary prepared by Panel Secretary, Frederick R. Taylor, University of Minnesota.

all might be avoided by allowing prices to seek their natural level and making direct payments to farmers when necessary.

The question of rehabilitating the underprivileged areas of the country was next discussed. A national policy must be set up to bring about a better balance in employment between areas and an increase in the productivity of the agricultural workers in these areas. The productivity of these areas can be increased by improved technology, increased industrialization, development of power projects, increased educational opportunities for the people of these areas, and expanded research towards adapting improved varieties and the better use of resources in these areas. The problem is essentially one of an unbalanced man-land ratio and improvement here might come from a more complete utilization of land resources, an increased employment of the people of these areas in decentralized manufacturing industries and the movement of some of the inhabitants of these areas to more industrialized sectors of the economy.

A national agricultural policy which would encourage farmers to lower their costs of production was next discussed. A state and national policy to encourage education, research and extension work along these lines is needed. Production quotas as now set up tend to retain inefficiency on our farms. Payments which are made contingent upon farmers having met certain efficiencies, increased productivity and skills, would improve the program. Payments linked to soil conservation, and the development of techniques to improve soil conservation practices, flood and erosion control might aid in the development of this program.

A discussion followed relating to the prospects of high prices being capitalized into higher land values and higher prices. Support prices tend to keep prices above the free or natural market level and therefore do tend to be capitalized. In working out a long-range agricultural policy, we need to develop a satisfactory general policy. We must think in terms of all sections of the economy first, and then relate policies for specific sectors of the economy to this general policy. It would seem clear that all policies must fit into the world situation. Care must be exercised to see that agricultural policies are consistent with international policies as well as those of other sectors of the domestic economy. We need to think in terms of basic guide-posts of policy, guiding elements in a long-range agricultural policy. In the past, we have laid out broad lines of policy for agriculture, but have not done this for the domestic economy or world as a whole. We have had special policy legislation, but not specific policy formation. Stress must be placed upon the significant differences between policy proposals and congressional action. Short-run problems can be anticipated by proper long-run policy proposals.

Goals of a good agricultural policy would include: (1) adequate resource use, (2) continuity (3) stability, (4) consistent with general and international policies, and (5) regard for the interest of farm people and the consumer. We must imply or infer a general policy as a setting for agricultural policy. Guideposts include: (1) maintenance of reasonable incomes, (2) improved efficiencies, (3) soil conservation, (4) better use of human resources, and (5) the maximum allocation of resources. The question arises

as to whether a policy that is shaped on expediency can rise above that level? If we start with the development of an agricultural policy, rather than that of a general policy, we are in danger of starting in the wrong place.

The next part of the discussion centered on the inefficiency of agriculture in the South. The question was raised as to how a shift can be made from small ineffective units, where the south has too much of human and not enough of other resources. The general opinion was that the shift cannot be made painlessly, and that the jobs will have to be done to a great extent by the south itself. A broad over-all approach will have to be taken where a review is made, area by area, of available resources, human and natural, and the possibilities of shift and change from prevent conditions. It may be necessary for the government to spend considerable sums of money to aid in the reallocation of resources, increased productivity, and the conversion to more economical units of production.

There are two general principles underlying American economic policy that must always be kept in mind. These are: (1) maximum freedom for the individual, and (2) a reasonable degree of economic stability and economic opportunity.

The discussion next centered on consumer interest on agricultural policy. The consensus of opinion seemed to be that consumers as a group are not very well sold on present agricultural policy. An agricultural policy needs not only to be sound but also needs the understanding and support of consumers to be effective. Nost of the particular problems facing consumers today are those which come from short-run effects. The consumer wants to be assured food and clothing from agriculture at reasonable prices. The fact must be emphasized to the public that they must pay a price such as will maintain production in the long-run. This country must have a stabilized level of production in order to be economically sound. Consumers need to know why and how surpluses arise and ways and means of dealing with them. The Treasury and the Federal Reserve Board must recognize at all times the effects of monetary and fiscal policy on economic stability. It is apparent that some over-all agency is needed in government that will coordinate responsibilities of government agencies regarding price stability.

THE AGRICULTURAL ACT OF 1948*

H. C. M. Case
University of Illinois

PAST history suggests caution in predicting the consequences of new legislation. However, in a democratic society a new legislative act may be considered a definite accomplishment if it improves the laws it supplants. Progress in legislation is likely to be slow. Perhaps the most serious handicap to desirable agricultural legislation is the very size of this country and its diverse sectional agricultural interests. Congressional viewpoints pertaining to agriculture are colored not only by these conditions but also by the proportion of urban and rural interests and the amount of state taxes paid to the national treasury as well as federal payments back to the individual state.

In seeking public interest in better legislation it is easy to criticize the lack of intelligent interest in pending legislation among the electorate. The public is likely to be confused in part by the tendency to attack one farm problem at a time without considering its relationship to broad national agricultural policy geared to a balanced national economy. An integration and understanding of the implications of new or proposed legislation seem imperative to sound policy attainment. Agricultural interests without exception have not been sufficiently aware of the necessity of keeping agriculture sold to the consuming public. With less than 20 percent of our population engaged in agriculture it becomes continually more imperative that agricultural programs be developed with due regard to the interest of consumers and that consumer education be an important part of any agricultural program. The consumer, without realizing it, is the chief beneficiary of technical developments in the field of agriculture. Time prevents a further elaboration of this point or of the basis for special agricultural legislation.

These are a few thoughts I would like you to keep in mind as we turn to a brief analysis of the content and intent of the Agricultural Act of 1948 together with some explanation of Congressional background pertaining to it.

The Agricultural Act of 1948 passed in the last hours of the 80th

* Paper given at the American Farm Economic Association Annual Meeting, Green Lake, Wisconsin, September 15, 1948.

Congress is limited mainly to a price support program. It is essentially a compromise between two different price support philosophies represented in the separate Senate and House bills. As finally passed, it provides for a flexible farm price support program adjusted to supply to become effective in 1950. That the long-range or flexible farm price support and the entire Senate Bill 2318 passed the Senate by a vote of 79 to 3 is significant in pointing to future legislation. The House bill was a stopgap measure passed by a small total House vote providing that most of the farm price support measures now in existence should continue for two years without adjustment of price supports to supply. The bill finally agreed to by the Senate and House conferees combines the two bills. It provides that the price support of basic farm commodities—corn, wheat, cotton, rice, and peanuts—will continue at 90 percent of parity until the 1949 crop is marketed or until June 30, 1950, thus shortening the period of high price supports contained in the original House bill. On July 1, 1950, the long-time flexible farm price support program will go into effect for these commodities.

The wartime Steagall Amendment provided for price supports for the socalled Steagall commodities at 90 percent of parity as a wartime measure designed to encourage increased production of commodities in greatest need for a period of two years following the declared end of the war. It was not anticipated by most people that the provisions of the amendment would continue under normal peacetime conditions. The Senate bill assumed since the war is over that a long-time price support program is desirable. However, the compromise with the House bill provides, in addition to the basic commodities, price supports for milk and its products, hogs, chickens, and eggs at 90 percent of parity until December 31, 1949, and for other Steagall commodities at not less than 60 or more than 90 percent of parity at the discretion of the Secretary of Agriculture until December 31, 1949. Tobacco according to a Senate Amendment is supported permanently at 90 percent of parity if marketing quotas are in effect. One may expect tobacco growers to keep marketing quotas in effect. The 1949 crop of wool will be supported at 90 percent of parity, but beyond that time at 60–90 percent of parity with the objective of encouraging an annual production of 360 million pounds of shorn wool.

Wool was given special consideration in order to maintain the sheep industry at a level adequate to meet a substantial part of

our needs without relying upon wool imports. The world demand for wool at the present time has forced its price to a high level. The support for wool will probably not be effective until the world consumption of wool falls much below the present level. The domestic production of shorn wool has now fallen below 300 million pounds to the lowest point in 47 years. Placing the goal of domestic wool production at 360 million pounds of shorn wool instead of 300 million was the result of a Senate floor amendment. The increase in the wool production goal may prove unwise, but the amendment was not opposed by the Senate committee partly in order to avoid extended floor debate at a late hour in the session. The 360 million goal is considerably below maximum production of the past when our population was less that at present.

The long-time features of the bill, which becomes effective in 1950, provide that a normal supply of corn, wheat, cotton, rice, and peanuts will be supported at 75 percent of parity price. Normal supply is defined as the past year's domestic consumption, expected current year's exports, and an additional percentage of the crop representing the supply in the normal channels of trade. As the supply increases by two percent of normal, the price support drops one percent of parity until it reaches 60 percent of parity with a supply of 130 percent of normal production. Also as the supply falls to 70 percent of normal the price support rises to 90 percent of parity. This flexible price support feature of the Act is the most distinctive feature of the new legislation and is intended to correct the present uneconomic program of supporting price without reference to supply.

The thought back of this long-time flexible price support policy is that the schedule provided, assuming the schedule might become effective with either large or small supplies, will assure a farmer a larger total income for a large production than for a small production but the price per unit of product will be less. This is in the interest of consumers who want abundant production since it encourages farmers to produce a large output. Further, a definite floor under the prices of these commodities will have a stabilizing influence on the market price. A severe break in the price of a farm commodity at harvest is due in part to farmers' hastening to sell their products before prices sink lower. Providing an actual floor under prices but at a given moderate level may have the effect of increasing the harvest-time price of grain if supplies are unusu-

ally high. Further, when prices of farm products are permitted to sink below 60 percent of parity as in the early thirties, the entire national economy is disrupted, because farmers, as well as others, cease to be normal purchasers of other goods and services. Low prices for farm products also contribute to unemployment.

The Act provides bases for farmers to vote on production control when the prices of basic commodities fall to 66 percent or less of parity for three successive months or when supply of a commodity exceeds the normal supply by more than 20 percent. If farmers vote for quotas, the support price shall be 20 percent above the market price at the beginning of the marketing year but shall not exceed 90 percent of parity, except in cases of national interest determined by the Secretary for the purpose of obtaining adequate supplies. If controls are voted down, support prices will be placed at 50 percent of parity. These regulations may be questioned and time may be required to test whether or not they are well founded. It was the hope of those responsible for drafting the Senate bill that controls will not need to be resorted to except for real emergencies, thus reducing control measures to a minimum.

When the long-range price support program goes into effect, a new parity price formula also becomes effective. This is based upon the relationship between the prices of farm products sold and of commodities bought by farmers in the period 1909–14 as in the present parity prices. It was decided that a new base period should not be established until a longer and a more stable period following the war had elapsed. The difference between the old and new parity formulas is simply this—the old parity formula maintains the relationship between prices of individual farm commodities in 1909–14 unless some other base period has been selected. This 1909–14 period does not reflect present-day price relationships because of changes in methods of production, the improvement in crop yields, changes in relative demands, and many other factors. The new parity formula uses the relationship of the price of an individual farm product to the average price of all farm products for the ten preceding years. This keeps the parity prices of individual farm products adjusted to changing demand and price relationships. It is an automatic formula which each year adds the new year and drops the oldest of ten preceding years as a basis for determining the parity price of individual farm products.

A good reason for establishing recent current price relationships

as a basis for parity is that about two-thirds of the approximately 155 farm products for which a parity price is figured have been given a new base period by the Secretary of Agriculture under his discretionary powers. Strangely some of those who have argued for new bases must have been quite clever in presenting their cases as some of the revised base periods seem peculiarly favorable to some products. A well-chosen common base period should relieve some suspicions.

In drafting Senate Bill 2318 it was recognized that areas of production of certain products had been somewhat influenced by price supports, that is, that price supports rather than underlying supply and demand conditions have influenced farmers in their production plans. Also it was recognized that the change from the old to the new parity would considerably change the relative parity prices of some products. In general, parity prices of grain would be reduced from 10 to 20 percent while those of livestock would be increased. However, the average for all farm products under the old and new parity prices formulas is essentially the same, the difference amounting to less than one percent. It was further recognized that there would be considerable opposition to a quick reduction in the parity price of important products. Senate Bill 2318, therefore, provided that when the new parity price is lower than the old parity price, the adjustment to the new parity price would take place at a rate no greater than five percent of the old parity price in any year. This was done to prevent such a sharp readjustment in price support as to impose undue hardships upon some producers. However, if the new parity price is above the old parity price, the adjustment to the new parity price will take place immediately since is was considered that such a change would be in the interest of the most economic production through encouraging the production of commodities in greatest market demand. This adjustment from old to new parity prices helped to enlist the support of certain Congressmen from areas producing products whose parity price would be materially lower under the new formula. Some Senators from areas where parity prices of the principal farm products will be affected adversely recognized that the new parity formula provided for a gradual adjustment of production in the interest of the most economic use of resources.

The price support bill further provides for the support of prices of other than the five basic commodities and tobacco at prices up

to 90 percent of parity with such funds as may be made available to the Secretary of Agriculture. The so-called Section 32 funds which represent 30 percent of our import duties are made available for farm price support operations. These funds amounted to 135 million dollars in 1947–48; of this amount 75 million dollars are now assigned to the School Lunch Program. This still leaves about 60 million dollars for supporting various commodities. In addition, the Commodity Credit Corportation is permitted to support prices of storable farm products if they are handled without too great a carrying charge. Section 32 funds will help support the prices of perishable products and, as a matter of fact, represent a larger fund than was used in any year during the war period if subsidy payments to hold down the prices of food products to consumers are excluded. The postwar experience with potatoes is another matter.

The 1948 Agricultural Act represents two radically different price support philosophies. The Senate Bill 2318, known as the Aiken Bill, regarded the Steagall price support measures as an emergency measure designed to stimulate production of products in short supply and to help ease the world food situation, and recognized further that the emergency food situation was drawing to an end. On the other hand, one can surmise that the House stopgap measure providing high price supports for the basic commodities and most of the Steagall commodities for a two-year period was designed at least in the belief of some Congressmen that at the end of the two-year period, when a Congressional election would be pending, high price supports could again be extended either permanently or for another two-year period. Some proponents apparently expected that if this were done, it would place farm products under constant controls. This is a significant difference in point of view from that of the men who drafted Senate Bill 2318, which provides flexible price supports based upon variations in supply with sufficient flexibility in supports to prevent ruinously low farm prices and also to encourage adjustments in production in line with demand. On the other hand, the House bill provided a high level of price supports which would afford little incentive for farmers to consider demand when planning their production. The planning apparently would be left to federal authorities.

In the meantime the extension of high prices supports for even 18 months may require the taxpayer to make good on a price sup-

port bill that may make the costs of potato price support look like "small potatoes." Thus the Aiken Bill philosophy is one of retaining freedom on the part of the farmer to adjust his production to meet demand in accordance with the free enterprise tradition of our country. This would place a premium upon farmer education and adequate economic outlook information.

Recognizing the course of legislative action and that 18 months of high price supports may accumulate burdensome supplies of certain farm products, any major failure of the Agricultural Act of 1948 to provide for workable long-time price support consistent with consumer interest may be charged in part to the Agricultural Committee of the House or their conferees who steadfastly refused to take the Senate Bill 2318 to the House floor for vote. There is reason to feel that except for this refusal, Senate Bill 2318 might have been passed by the House. At least this was the thought of some important members of the House who had accepted the House bill as a stopgap measure to assure a greater measure of support for agricultural prices than the 1938 Agricultural Act which would, of course, have become effective at the expiration of the Steagall Amendment without further legislative action. Attention may well be called to the fact that the Senate defeated the House bill by a 2 to 1 vote even though some of its supporters believed because it was so near the end of the Congressional session that it afforded the only means of securing any price legislative action in the 80th session of Congress. The prompt Senate vote of 79 to 3 for the entire Senate Bill 2318 after defeating the House bill indicated stronger support than anyone had anticipated.

At this point it is of interest to note that the press and the Agricultural Services in Washington had quite consistently predicted no agricultural price legislation at the recent session of Congress. Furthermore, after the passage of the Agricultural Act the press predicted revised legislation in the next session of Congress providing for higher supports than in the law as passed. We see now, however, how quickly opinion can change. At the moment the feeling seems to be growing that the basic long-range price support principles will remain fixed as contained in the Agricultural Act of 1948. This statement is made mainly because the major farmer organizations have supported the long-range price support program. Any new legislation pertaining to price supports will lower rather than raise them for the 1949 crop year. Should any House

member be so unwise as to attempt an upward revision of the long-range price support schedule, some of the commodities receiving preferred treatment may receive further consideration. The favored treatment of tobacco, which crept into the bill in the late hours of Congress by a vote of 41 to 39, was mainly because some Senators had already gone to Philadelphia to help write the Republican platform. Furthermore, some people have questioned the favored treatment of peanuts, which represent less than one percent of the national agricultural income, and of rice with only 10,000 producers. Some Senators refrained from expressing themselves on some of these favored minor products only from expediency in order to avoid long debate in the closing hours of Congress and of getting the more desirable features of the bill enacted. Possibly the most likely revision of the price support features of the Act will be to provide comparable long-range price supports for additional products.

Since it was the apparent intent of this evening's program to point toward future legislation, certain comments pertaining to the relationship between the two Houses of Congress seem in order. The 79 to 3 support of the Senate Bill 2318 and the unanimous support of the bill by vote of the Subcommittee and full Committee on Agriculture and Forestry all indicate the trend of Senate thinking relative to future argicultural legislation. The guiding principles or essentials of a long-range agricultural policy likely to direct legislative action in the Senate are set forth in Senate Report 885. These received enough consideration so that one may believe that they will not be lost sight of by the Senate Committee on Agriculture and Forestry. Also, it is likely that the policy statement in Senate Bill 2318 which was dropped in conference is now well fixed in the minds of the aggressive agricultural leadership of the Senate. One need not draw heavily upon his imagination to recognize that if the House had accepted Titles 3 and 4 of the Senate Bill 2318 dealing with farm price supports without insisting upon a year to 18 months of high supports, the Senate might have been willing to make some concession in the future relative to the reorganization of federal agencies and conservation legislation originating in the House. However, it would appear to a layman that following the insistence of the House for high price supports that the Senate will have no compunction in attempting to have at least equal weight with the House in framing future farm legis-

lation. Possibly the Senate will receive more executive support than the House based upon the past session's accomplishments. It is idle to predict just what might happen with regard to any attempt to lower the high farm prices supports prior to January 1 or July 1, 1950. Certainly at the time the legislation was passed the high level of 1948 production of corn, wheat, and cotton as now estimated was not foreseen. The House Agricultural Committee is likely to find itself confronted with dissatisfied farmers and consumers with the price of farm products supported not too successfully at heavy public expense and on a basis not approved by the public. Difficulties are likely to arise with these three basic commodities and with potatoes. There would appear to be little need of high price supports for most of the Steagall commodities during the next year or longer because the supply of animal products in particular cannot be increased materially in a short space of time. The reduction in livestock production from the wartime peak is not surprising when one considers the relative price supports provided by the Steagall Amendment and the scarcity of farm labor and feed. The evidence is increasing that desirable changes in production are most likely to occur when prices clearly reflect the relative supply and demand for farm products.

In conclusion, there are a few claims that can justly be made for the long-range price support provisions of the new agricultural legislation:

1. The flexible price support feature of the Act should make supply and demand the major guides to farm production.

2. The revision of parity prices will tend to give encouragement to the production of livestock, which will aid in disposing of burdensome grain supplies and indirectly encourage better human nutrition.

3. The minimum support level for basic commodities and other commodities within the limit of the available funds should prevent ruinously low prices.

4. The judicious use of Section 32 funds, made available for price support operations, should materially aid in stabilizing prices of other than the basic commodities and should encourage better human food habits.

5. Assuming the price support program becomes operative at both high and low support levels, it assures farmers a larger return for a large production of basic commodities than for a smaller

production, and this helps assure consumers an abundant production.

6. When other means fail to keep production within bounds it provides for production and marketing quotas if farmers want them.

7. The 50 percent of parity price support if farmers vote against controls avoids coercing farmers into accepting controls as would be done if all supports were withdrawn when farmers vote against controls.

8. Finally the Act leaves even the level of price supports to the discretion of the Secretary of Agriculture, but a wise Secretary would not depart from the price supports provided in the Act except in real emergencies.

FOOD SUPPLY PROBLEMS

Chairman: Sherman E. Johnson, Bureau of Agricultural Economics

WORLD POPULATION TRENDS*

CONRAD TAEUBER AND IRENE B. TAEUBER

VIEWING with alarm is almost as characteristic of demography as of the "dismal science" of economics, for each generation tends to project the rates of population change that then exist into the indefinite future and to foresee dire consequences therefrom. With Malthus' famed Essay on Population there began a century and a quarter of demographic pessimism, even though he wrote at the beginning of an era that disproved his gloomy forebodings for the Western cultural area in which he lived. In the recent interwar years a new pessimism developed, for improved statistics and more powerful analytical tools revealed that current population increase was illusory and that population decline was imminent in the Western world. Population projections for Europe and the Soviet Union, published by the League of Nations in 1943, traced through to 1970 the effect of a continuation of the trends doward decline in fertility and mortality that had characterized the interwar period. These projections indicated that, even in the absence of any losses from World War II, Europe excluding the U.S.S.R. would reach its maximum population by 1960, and would then enter a period of slow decline, with a reduction of about 1% between 1965 and 1970. The decrease would come primarily in Northwestern and Central Europe which would grow slightly between 1940 and 1950 and by 1970 would have declined 4 % below the 1940 levels. Southern and Eastern Europe would continue to grow, though soon these countries too would follow the pattern of decline that seemed so obviously present in the remainder of Europe. In the U.S. a careful set of estimates seemed to indicate the indigenous population growth would come to an end by the end of the twentieth century, perhaps as early as 1970. A number of European countries developed population policies to avert the threatened declines. In some countries militarism dictated the drive to maintain numbers, while in others

* Paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wis., September 13, 1948.

economic motives predominated. This was the period when Keynesian economics united with population predictions to justify the maintenance of increasing populations. In other guarters the questionings of the future were based on the belief that cultures themselves could not hope to survive if the people who were their carriers failed to survive biologically. Pro-natalist population policies and programs were developed in countries with widely devergent political orientation, but in all there was deep scepticism as to whether any trend as deep as that toward population decline could be arrested, let alone reversed.

Thus by the end of the first quarter of the twentieth century the Western world appeared to have resolved the dilemma which Malthus had posed at the end of the eighteenth century, though in doing so it had created problems equally grave. Food resources had increased more rapidly than population, thanks in part to improved production techniques, to increase in the available area, to an ever growing commerce with other parts of the world, and in part to a decline of rates of population growth.

Concern with the prospects of population decline would seem strange indeed to most of the world's peoples, could they comprehend the arguments. While Europe's growth was slowing, the large populations of Asia, the natives of Africa, and the peoples of South America, were increasing rapidly. The world's population problem was illustrated dramatically in the reports of the 1931 and 1941 censuses of India, which indicated that in a single decade its population increase alone amounted to more than the total population of the United Kingdom.

World War II, great catastrophe that it was, did not reduce the world's population. Battle casualties were high in many countries. In some the disruptions of war increased civilian mortality, and China and India suffered famines. The victims of genocide numbered in the millions. Forced population transfers, large scale movements of refugees, and the extension of the battle front to include civilians added still further to war's toll. The total human cost of World War II, though large, cannot yet be estimated with even approximate accuracy. It is possible, however, to compile the official estimates of nations as to their own populations at comparable time periods before and after World War II. Such a compliation, based on the years 1936 and 1947, reveals that the world's population increased nearly two hundred million in the eleven

years that included World War II and its aftermath of want and dislocation (Table 1). Half the reported increase is in Asia. The rates of increase for Central and South America are high, some 24 percent, while Africa, Oceania and North America are reported to have increased by about 14 percent. In much of Europe, as in the Western world in general, war losses were mitigated by the relative maintenance of birth rates during the war and the extraordinary spurts in fertility in the postwar years. Europe's net gain for the eleven year period was four percent. Official estimates for the present boundaries of the U.S.S.R. are not available, but the information that can be assembled indicates that some increase probably occurred there also.

TABLE 1. WORLD POPULATION: PROVISIONAL ESTIMATES FOR 1936 AND 1947
(Populations in millions)

Area	1936	1947	Percentage Increase[1]
Asia (excl. postwar area of USSR)	1,130	1,236	9
Europe (excl. postwar area of USSR)	371	384	4
North America[2]	139	157	13
Latin America	123	153	24
Oceania	10	12	15
Africa	161	184	14
World Total (incl. all areas)[3]	2,120	2,320	9

[1] Percentages computed before rounding.
[2] Excluding Central America.
[3] Estimates contain an approximate allowance for the population of the postwar area of the USSR.
Note: Estimates are based mainly on data furnished by the Statistical Office of the United Nations.

The Trend of World Population

Population increases have been a regular feature of the modern period. In the pre-modern era population growth had been generally irregular. Normal death rates were high, and the population surpluses of good years were periodically wiped out by famine, epidemic, and war. But gradually as economies expanded and statistics developed, the fact of a generally upward trend of the world's population became indisputable, although the date of the beginning of the increase and its magnitude remain debatable. The most widely accepted estimates of the trends in world population from 1650 to the present are presented in Table 2. They indicate

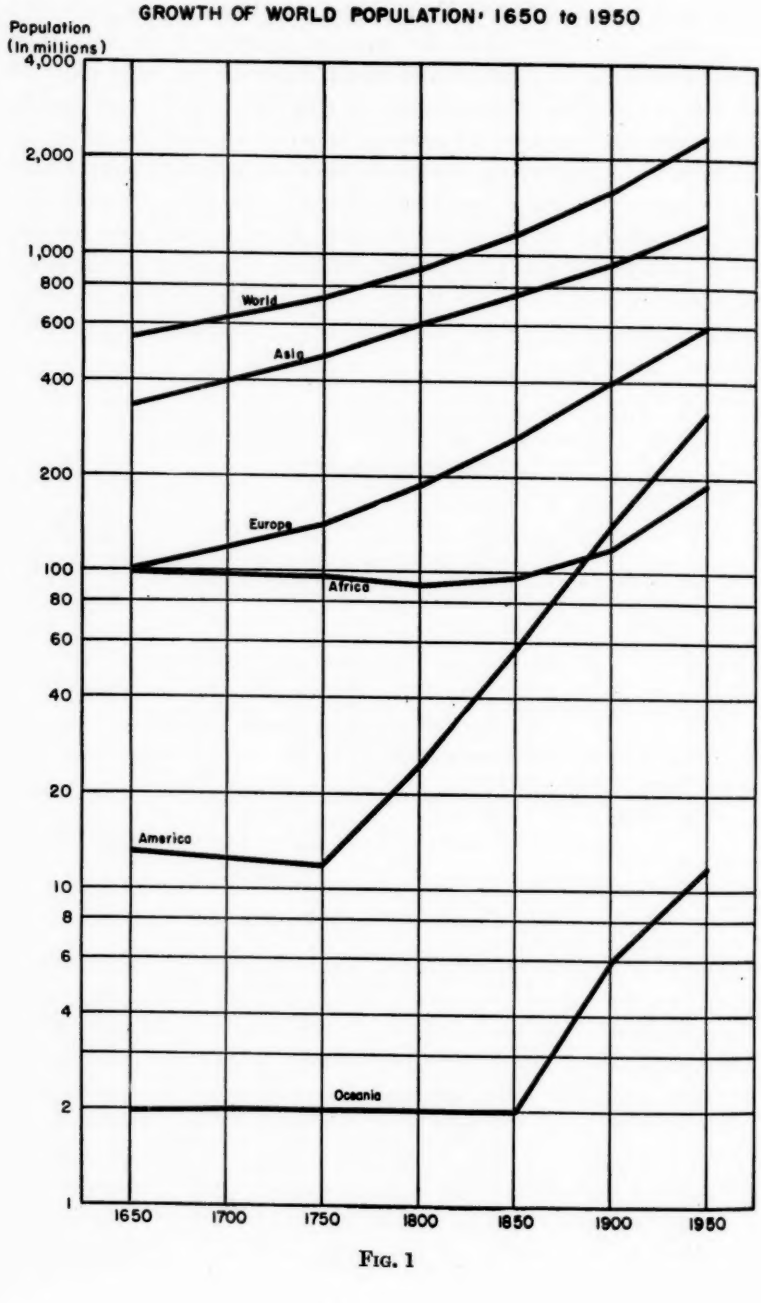
GROWTH OF WORLD POPULATION: 1650 to 1950
Population (In millions)
4,000
2,000
1,000
800
600
400
200
100
80
60
40
20
10
8
6
4
2
1
World
Asia
Europe
Africa
America
Oceania
1650
1700
1750
1800
1850
1900
1950

FIG. 1

that the population of the world has increased approximately fourfold in the last three centuries, from 545 million in 1650 to 2,400 million in 1950. Population doubled in the two hundred years from 1650 to 1850, doubled again in the century between 1850 and 1950.

Practically all parts of the world participated in the population increase of the modern period. The most rapid rate of increase is that of the Americas, due to the coincidence of heavy immigration and high rates of natural increase. The increase for Europe is one of the striking phenomena of the period. During these three centuries Europe not only increased its own population six times but also supplied the bulk of the migrants to the Americas and Oceania. Asia more than trebled in numbers to reach 1.3 billion people by 1950.

A simple projection of the rates of increase of the world or the continents into the future would be most fallacious, for as Table 2 shows clearly, the rates of change of the world and its areas have been changing over time.

TABLE 2. WORLD POPULATION GROWTH: 1650 TO 1950
(Population in millions)

Area	1650	1750	1800	1850	1900	1950
Africa	100	95	90	95	120	194
America	13	12	25	59	144	324
Asia	330	479	602	749	937	1,270
Europe	100	140	187	266	401	600*
Oceania	2	2	2	2	6	12
TOTAL	545	728	906	1,171	1,608	2,400

* Including the Asiatic part of the USSR (population about 20 million in 1897; about 40 million in 1939).

Source: Estimates for 1650 to 1900 from A. M. Carr-Saunders, *World Population—Past Growth and Present Trends* (Claredon Press, Oxford 1936) figure 8, p. 42. Estimates for 1950 are based mainly on data furnished by the Statistical Office of the United Nations.

Analysis of the dynamics of change in the various areas and time periods is clearly needed. The factors at work may be illustrated by two contrasting situations: that of the Western world, consisting primarily of Europe and Europeans overseas, where population growth has slowed so much that declines may occur in the near future, and that of the rice areas of Asia, where continued or even increasing rates of natural increase in already densely peopled areas offer a challenge to human engineering so great that many regard it as insoluble.

The Western World

The modern growth patterns of the Western peoples is the resultant of a number of historical developments. The early results of the agricultural and industaial revolutions were decreases in mortality. The large family pattern which had been an essential element in group survival in the subsistence agrarian economies of the ancient and medieval worlds was not immediately affected. Later the changing pattern of working and living in urban industrialized areas, and the growing realization of the fact of mortality control, led to changing individual and group values. Agricultural innovations in the old world combined with the opening up of the large resources of the new world to provide the food supplies that supported continued increases in population. Industrial innovations brought increases in production and provided employment for a population that would have been redundant in the agriculture of the period. Sanitary and medical advances brought under control the diseases that had previously produced high levels of infant and adult mortality. In short, the whole process of modernization in the western world brought rising levels of living and new controls over mortality.

Fertility was much less responsive to the new patterns of development. Gradually, however, new individual and group values developed in response to the changed conditions of working and living in industrialized and urban areas. The small family pattern became not only the ideal but also a goal realized by an increasing proportion of the population. Birth rates fell, first and most rapidly in the cities, later in the surrounding rural areas, The modern increases in population were a function of the time lag between the control of mortality and the control of fertility.

The control of mortality is achievable through increased and regularized food supplies, improved knowledge and application of the principles of health and nutrition, and sanitary and medical programs designed to control disease. Moreover, the limitation of mortality fits in which the major values of virtually all cultures. Death is generally abhorrent to the individual, as to the group, though there are widespread differences in the degree to which this is true. Techniques and activities that are intended to prevent death and to prolong human life have generally triumphed with relative ease over beliefs and practices that they challenged. Furthermore, some of the major advances require relatively little

active participation by the individual. The application of DDT to large areas that were previously infested by insects or using large machines to clear the brush that harbors the tsetse fly require little more than acquiescence of the people affected. Stringent quarantine regulations to prevent the spread of cholera and plague do not require active participation of large segment of the population. Even immunization requires only a small amount of activity by most of the individuals affected. And to a large extent the individuals who resist such activities can still be the beneficiaries of the fact that the community as a whole sanctions them and participates in them. Religious sanctions generally are on the side of mortality control; on the whole, the great religions of the world have obliged their adherents to practice cleanliness and sanitation. The control of fertility, unlike that of mortality, involves deep transformation of human values and relatively complete reorientations of the role of women and the structure of the family. The conditions which tend to create a favorable psychological and moral climate to family limitations are varied. They include such factors as a growing awareness of the potentialities for economic improvement and a desire for such improvement, a realization that control of mortality, especially of infact and child mortality can be achieved; the disruption of older family patterns that accompanies industrial and urban developments; education, especially the education of women; and the growing tensions between the standards of living (representing the aspirations of people) and the levels of living (representing the actual achievements).

The means by which such reduction occurs are not identical in all cultures. They include an increase in the age at which women are married, especially a reduction in the proportion of teen age girls who marry; an increase in the employment of women outside the home; a high ratio of celibacy; and the spacing of births through a variety of techniques, some of which are generally accepted as "natural."

In the Western world, Ireland offers an illustration of family limitations within a cultural setting that is opposed to most techniques to limit fertility. In Ireland, where the fertility of married couples is relatively high, the rate of natural increase in the last 70 years has been relatively low. This is due in large measure to delayed marriage; in 1941, three fifths of the women 25–29 years old were single, and even among women 45 years old and over one

fourth had never married. Despite the late average age at marriage the illegitimacy rate is very low. The result is that this largely rural country has birth rates that are consistent with those of other countries in northern and western Europe.

The Rice Areas of Asia

The problem of achieving a new balance of deaths and births that shall secure efficient human reproduction without an overproduction that threatens to negate economic progress is at once more and less difficult in the East than it was earlier in the West.

The large family pattern is deeply rooted in the agrarian rice countries of Asia.[1] Permanent rice agriculture within a given region requires the continuing cooperation of the generations in a stable pattern of relationships. The strong familial social structure which has such high group survival value in creating continuity and stability is also essential to individual survival. The cultivation of rice by hand techniques has heavy seasonal requirements for labor, and these can be met within the traditional social structure only by members of family groups. The population of a village or a region may be too large for the available resources in terms of western standards, but the individual couple without either the help of a larger family group or the labor of their children is in a hopeless economic situation. Here familial and group patterns throughout the area are oriented toward the reproduction of the population. Traditional behavior, the identity of past, present and future as an eternal and unchanging process, the repudiation of the deviant, the abhorrence of change, these are the psychological characteristics that have accompanied the familial social structure and in conjunction with it, have facilitated survival in the rice deltas for hundreds or even thousands of years.

In a period of high mortality, high levels of fertility were essential to the survival of the group. Cultural changes, such as those involved in industrialization and urbanization create a climate favorable to positive steps toward reduction of traditional fertility levels, as the rapid decline of fertility in an industrializing Japan has so clearly indicated. In much of the western world individual measures to control fertility run counter to religious and

[1] Irene B. Taeuber in "Migration and the Population Potential of Monsoon Asia." Milbank Memorial Fund, *Postwar Problems of Migration*, pp. 8–11, and in "Trends of Population in Non-Soviet Asia," *Social Science* 21 (4): 306–309. October, 1946.

traditional values and may even meet with formal prohibition. There is no reason to believe that the Muslin, the Buddhist, or the Confucian religions would impose prohibitions on the use of contraceptives as such, but the areas where they are prevalent are generally agrarian areas with strong familistic traditions. In many of these areas a woman's position in the family and in the community is rated by the number of sons she has. To be childless is a disgrace. Moreover, in these areas there are economic and other limitations to the utilization of conventional contraceptive devices. How quickly such values yield to considerations of personal health and well-being of mothers or to other criteria for establishing a woman's position in her community is not easily predicted. But although infanticide is no longer widely practiced, methods for inducing abortion are found in virtually all cultures. Moreover, the resort to techniques, such as prolonged breast feeding of infants, which are believed to reduce fertility, is so common in all parts of the world as to suggest that other means would also be applied if they become readily available. What might happen to birth rates if a simple, inexpensive and effective contraceptive were to be placed within the reach of the world's large agrarian populations can only be guessed at the present time. In most high fertility areas, there already are some social groups which effectively control their fertility.

Growth Potential of Regions

A description of the growth of the world's population by continents and a contrast of two types of areas, the technologically advanced and urbanized West, the backward and rural rice areas of Asia does not adequately portray the wide variations in demographic characteristics of the countries of the world. Actually, the world's peoples may be regarded as occupying a continuum from the relative population stagnation of uncontrolled fertility and high mortality to the population decline that ensues when births are inadequate to maintain numbers even under maximum conditions of controlled mortality.

One fifth of the world's population lives in areas in which the shift from high mortality and high fertility to low mortality and low fertility is largely completed. Despite large wartime and postwar increases in fertility in some of these countries, the control of fertility is firmly established in the value systems of these people.

In fact, the recent increases in fertility reflect the extent to which controlled fertility responds to economic and social changes. Relative stability in numbers during the latter half of the twentieth century appears the most likely prospect though there may be some actual declines. These are the economically advanced industrial and urbanized nations, including all Europe except the extreme east and south, the United States, Canada, Australia, New Zealand, and the white population of South Africa.

Another fifth of the world's population lives in areas which are well advanced in the demographic transition from high to low fertility but appear likely to continue to increase their number at relatively rapid rates in the next generation or two. These areas include the U.S.S.R., Japan, Eastern and Southern Europe and parts of Latin America. Wartime population losses may temporarily lead to measures to stimulate or retard the rate of its decline, but the long time trends toward lowered fertility are likely to be continued.

Three fifths of the world's population lives in areas where famines and epidemics, chronic malnutrition, and debilitating diseases are major forces in controlling population numbers. The people of these areas generally have high levels of fertility, high levels of mortality and therefore a potential rate of population growth which is very high. As these areas achieve greater political stability, improve their agriculture, develop industry, and secure minimum standards of epidemic control and famine relief, mortality levels will probably be reduced. These areas include most of Asia, except Japan; Africa except South Africa; and parts of Latin America.

The Prospects

Today the world's population is increasing at approximately one percent per year. It may be slightly more; it may be considerably less. Many of the statistics, especially those for areas which appear to be growing rapidly, are open to considerable doubt. As improvements are made in the completeness and adequacy of a statistical series, differences between current and earlier levels are easily exaggerated. This can and does affect many of the population statistics that are currently in use. However, caveats on the interpretation of numbers that are put forward by countries as intelligent could not alter the fundamental fact that the increase of the world's population is continuing and sizeable. Moreover, the three fifths of the areas in which fertility control has not yet been widely adopted

is making rapid strides in the direction of taking one of the major steps in mortality control, namely the control of infectious diseases. To what extent there will also be an increase of political stability, thus favoring agricultural and economic development, remains to be seen.

Projections of the future populations of Asia, Africa or parts of Latin America is not possible on the basis of demographic history alone, nor on the basis of the theoretical rates of growth. Neither the analogy of the experience of the industrialized west or of an industrializing Japan are any reliable guide to the future of these regions. In the industrialized west the transition from high mortality and high fertility to low mortality and low fertility required approximately 300 years; Japan carried through a similar process of industrialization and urbanization that should terminate the period of growth in less than a century and half. But in Asia, very large numbers would be added if mortality falls as rapidly as it has in other areas and the process of the diffusion of the small-family pattern from the city to the countryside proceeds as slowly as it has in other areas. In the case of China, for example, it has been estimated that if the declines in mortality and fertility were to duplicate those in Japan between 1870 and 1940, the Chinese population would reach one billion by the year 2000.

Food supply is obviously one of the major factors in current levels of mortality, and in the prospects for rapid extension of mortality control. In terms of the prewar situation the relationship was quite clear.[2] Half the world's total population then lived in countries which had available less than 2250 calories per person per day at the retail level, and over ninety percent of these people lived under conditions that produced crude death rates of 30 per thousand or above; at least three times as high as the 1947 rate in the United States. The exceptional ten percent of this group are accounted for either by the fact of better balanced nutrition in spite of lower calories values or through the extension of modern health and sanitation programs imposed from the outside, as in Formosa, Korea, Philippines and Puerto Rico. At the other extreme, so far as food is concerned, is that less than one eighth of the world's population for whom food available at the retail level, if evenly distributed, would have provided 3000 calories or more,

[2] "Food, Income and Mortality," *Population Index* 13 (2): 96–103, April, 1947.

per person per day. In all those countries but one, the death rates were below 15. Between the upper eighth and the lower half, there is a wide range of conditions both of nutrition and of mortality. Here too there is some freedom of decision, in the sense that at a given food level and health, social and educational policies may be adopted to control mortality if the people so wish. This group also includes a wide diversity of economic conditions, ranging from those still largely dependent on subsistence agriculture to the semi-industrial and industrialized countries.

Two major elements in the western European transition from high mortality and high fertility to low mortality and low fertility are not likely to be repeated as the similar demographic development takes place in other parts of the world. The one is the large scale emigration to unoccupied areas—then the Americas and Oceania—which came at a time when population was growing rapidly due to the more rapid reduction in death rates than in birth rates. The other is the expansion of the resources base through exploration and colonial development. Today it is difficult to visualize a situation in which large surplus areas could produce and ship enough foodstuffs to fill the gap in the needs of the densely populated deficit countries. Increasingly feeding the native population in exporting countries constitutes a first claim on available supplies.

These areas can be counted on insofar as the application of scientific methods provides a far greater output than has hitherto been available. Then they might provide a surplus for export over and above satisfying the needs of improved living levels of the native workers. That is the assumption underlying some of the current large scale development programs in Africa and Latin America.

Changes in the "state of the arts" are obviously a major factor in any consideration of the relation of population and resources. To project demographic calamity on the basis of present population trends assuming that the "state of the arts" remains static is to overlook the history of the last three hundred years. Neither can projections safely be based on the easy optimism of the interwar decades in which it was assumed that fears of over-population and the resultant disaster would be proven wrong within a short period of time by some immutable "progress of the arts."

The limits on the world's supply of good soil and water must be reckoned as a hard fact. But there are social facts which are equally real. And one of the major social facts is that no responsible govern-

ment will voluntarily reduce its population numbers. Prime Minister Nehru of India at the opening of the recent meeting of the Economic Commission for Asia and the Far East expressed the situation in the following words: "A great deal has been said about the population of India and how it overwhelms us and we cannot solve any problem at all till this Indian population is checked or decimated. I have no desire for the population of India to go on increasing. I am all in favor of the population being checked, but I think there is a grave misapprehension when so much stress is laid on this population of India and every evil that India has is supposed to flow from this excess of population. I entirely disagree with that."

Whether the motivation is national pride, the basic desire for national survival, or a desire for manpower to fill potential military needs, voluntary decline of a nation's population does not seem likely. It is almost an inevitability that any nation which is faced with decline will take drastic steps to correct the situation. Moreover, governments will continue to be concerned with finding the resources needed to supply their peoples with basic necessities.

There appears to be little possibility for minimum living within agriculture for the increased population that would result in Asia and Africa from the introduction of the agricultural improvements necessary to adequate nutrition and other elements of living. There must be rapid transfer of people from agricultural to non-agricultural employment. If industrialization occurs and if population growth follows the patterns of areas that have undergone such a transition, fertility will fall as urbanization and its correlated habits of living and thinking are accepted by increasing numbers. These processes are almost certain to occur, but the real demographic need in Asia is to devise ways by which the diffusion of the small family pattern among the peasants may be quickened.

The problem is not alone agricultural, susceptible to solutions within the framework of agriculture. Land resources everywhere are limited, and population pressure on the land is itself one of the major depressants of agricultural productivity. Rural over-population means rural underemployment and inefficiency. Human abilities stagnate during a large part of the year and the rewards for human labor fall far short of what they might be. Unless some way is found of reducing the number of people trying to gain a livelihood from an underdeveloped agriculture, the way to achieving desirable levels of production and nutrition may be barred.

The future population growth of any area is inextricably bound up with its economic and social resources and characteristics and the rates at which they change. To neglect any element in that complex of factors would lead to errors in projections into the future, and yield results that are too "optimistic" or too "pessimistic" as the case may be.

The increase in political self-consciousness of some of the rapidly growing population groups means that among their claims will be an urgent one to secure the maximum possible results from the opportunities which modern science and technology have to offer. Developing the opportunities that lie ahead calls for rapid large-scale developments of agriculture, industry and trade, and educational and other services, and requires large investments of capital and technical skills. This new situation, if it eventuates, may so quicken social change as to reduce drastically the length of the period in which the gage between declining mortality and a still high fertility produces rapid population growth. Half measures and efforts at amelioration are not enough. They are likely to serve in the future, as so often in the past, only to increase the numbers of the poverty stricken and ignorant. Demographic catastrophe is not necessarily the outcome of the forces now at work, but it may be the result if the problems are not faced and attached squarely and realistically.

FOOD PRODUCTION POTENTIALITIES AND PROBLEMS*

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FOOD for everyone might not insure peace. People long for other things, some good and some bad. So we cannot be sure. But we can be reasonably sure of the opposite: Without sufficient food for the population of the world peace is uncertain, indeed unlikely. No group nor region can expect security while others dread the very approach of another day of hunger.

Can the people of the world feed themselves? The question has many facets. First, is there enough good soil on which to raise the food? Or have we reached the limit in area, or in productivity per acre, or in both? Even if theoretical answers to these questions are favorable, could the materials and skills of modern technology be developed in the right places? Would farmers become virtually slaves in the attempt? Are the economic and political obstacles insurmountable anyway?

These questions are too broad and too complicated to be answered precisely with the data and experience available. Yet we must try to approach answers—to reach some first approximations, else we shall be unable to set even ideal goals or to measure our own ability to achieve them.

Just now I want to discuss primarily the physical and biological aspects of the production problem. In those terms alone, could we feed the world?

First, let us take a general view of the world's land supply. A large part of the land area of the world cannot be cultivated: Around 11% has everlasting snow and ice; some 4% is tundra; about 16% is in the high mountains; and another 17% is desert or semi-desert.[1] These inhospitable landscapes make up nearly one-half of the land area of the world. Yet even these lands are not unimportant agriculturally. Many spots of desert and semi-desert are irrigated with water collected from the high mountains. Besides, semi-deserts and mountains furnish grazing of significance.

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[1] L. I. Prassolov, *Soil Types in the Agriculture of Different Countries*, Pedalogy (Moscow) 69–76, No. 2, 1946.

Nor is the other one half of the world's land all good soil, not by any means. Some areas are too sandy, too stony, too salty, too hilly, or two wet for cultivation. We cannot add up precisely how much is suitable for several reasons. First of all, detailed soil maps are available for only a small part of it. Indeed, we cannot say that we even yet have entirely reliable sample surveys of the great areas of tropical soils. Secondly, the use of land for agriculture depends on the state of the agricultural arts and these, in turn, depend upon the transportation and industrial facilities of the same region. Above all, any estimate must be based, consciously or unconsciously, on some economic assumptions. It is physically possible to grow crops almost anywhere. Dykes may be built; water may be piped long distances; stones can be removed; mountainsides may be terraced. On the other hand, all use of land for crops requires at least some work and materials. So even if we had complete data and had all the soils of the world arranged in some descending scale of productivity according to response to management, a line above which we should regard them as arable and below which we should call them non-arable would move with changing economic conditions.

Now something less than 10% of the total land area of the world is cultivated. This separation between cultivated and non-cultivated land is even a little vague and equally reliable estimates vary widely. We may move by gradual stages from very intensive cultivation under glass and in gardens, through general farming to extensive farming with fallow, and almost imperceptibly to the nearly wild grassland, savanna, or forest.

In the temperate regions of the world the better soils are nearly all occupied; of course, not all of them. We could expand considerably here in the United States. But the areas of poor soil now used, which are not sufficiently responsive for minimum standards of farm income, partly offset the potential unused areas.

But north of the temperate region, the cool-temperate Podzol region, only about 1% of the soil is cultivated.[2] The great areas of these soils are in the Northern Hemisphere—in northern Eurasia and northern North America. Although they make up some 9% of the land area of the world, only an exceedingly small part is cultivated. If we assume, on the basis of experience in Scandinavia and

[2] For more detail on the origin of these estimates see: Robert M. Salter, "World Soil and Fertilizer Resorces in Relation to Food Needs," *Science* p. 533. 105. 1947.

elsewhere, that only 10% of these might be brought into cultivation, we should have 300,000,000 acres of new arable land. At least when first cultivated, these soils would not be so fertile as those of the temperate region but experience has demonstrated that they can be developed for dairying and for potatoes and other vegetables.

Of far greater importance are the great areas of tropical soils in Africa, South America, Central America, southeastern Asia, and the Pacific Islands. The most important areas of tropical soil now in use for crops lie in southeastern Asia, India, and some of the Pacific Islands. In the southern part of the United States excellent use is made of soils in a warm-temperate humid climate that are somewhat related to those of the tropics. Here and there in both Africa and South America tropical soils are in use but the great resources of tropical soils in these continents are hardly more than touched. If only 20% of the unused tropical soils in the Americas and Africa alone were brought into cultivation somewhere around 900,000,000 acres of arable land might be added to the total. To these potential areas, it is conservative to add another 100,000,000 acres of tropical soil in the great islands like New Guinea, Madagascar, and Borneo.

We may get some notion of the potential productivity of this billion acres of tropical land from experience in the Philippines. An estimate based on that experience would be on the conservative side and would not take account of the great potential increase in efficiency of production that would result from the application in the tropics of modern science, comparable to what has occurred in the temperate regions over the past 100 years. The experience of Finland may serve as a guide to the potentialities of the Podzols. Of course, some classes of products could be increased far more than others, but generally the additional production from those lands would permit us to more than meet most items in the world food needs for 1960 as estimated by the Food and Agriculture Organization of the United Nations, although a few would be short.

This is a lot of land—1,300,000,000 acres. Probably the estimate is either too low or too high. That will depend a great deal on economic conditions when a more accurate check is possible. But I must emphasize that these are "difficult" acres. Very little new soil is simply waiting for the plow. Most of it requires clearing. Most of it is off our present routes in the interior of continents or away from good harbors. Roads, electric power, medical facilities, and

local industry must go along with agricultural settlement. All these soils will need careful management. Many acres will need terraces, levees, partial drainage, or supplemental irrigation. A large part will require lime and fertilizer from the very start. It will take more than "free enterprise" in the breast and a plow in the covered wagon to settle these acres. But planned settlement can be successful.

But do we need all this new land? Besides the new land what can we do with what is already under the plow? Careful estimates made cooperatively by the Department of Agriculture and the Land-Grant colleges indicate that it would be entirely practicable to increase agricultural production in the United States by about 20% on most items and higher than that on several, under economic conditions of nearly full employment. Considering the relative state of the agricultural arts in the various countries of the temperate region, at least equivalent percentage increases are possible in the rest of them—possible from a physical and biological standpoint, assuming an economic system in which farmers may operate efficiently. Thus without the new soil, the food needs of the world could be met for cereals, roots and tubers, and sugar. But some new soil, or further increases in yields beyond those assumed, would be needed to supply a bit more fats and oils, and much more pulses and nuts, fruits and vegetables, meat and milk.

These two together—the potential new land and the increases demonstratably possible on land now being farmed—could give us food significantly beyond that needed for the estimated world population of 1960.

Such estimates are very optimistic in one sense and probably still too low in another. They indicate what *could* be done with present knowledge *if* the political and economic barriers to effective soil use were somehow removed. At the moment, this "if" may seem to call for miracles of education and statemanship that few expect.

Yet even these estimates take no account of entirely new technology. They merely assume a general acceptance of existing technology to the same extent already used on many farms and in many communities. Yet we know that the efficiency of farm production has been increasing at an accelerated rate for many years.

In the temperate regions, especially in Western Europe and the United States, people have taken more or less for granted a steady increase in agricultural efficiency resulting from modern science.

Did you ever stop to think what would happen if all the people left the United States for 50 years? When they came back how many of our cultivated plants and domestic animals do you suppose they would find? Very few indeed. Most of the superior strains would be gone. With luck, they should find a few specimens here and there from which scientists could begin a breeding program all over again—a program that would take years even with modern techniques. That is, our agriculture has been built up to a high level far above that of the natural environment.

In Europe the effect of science began to be felt in agricultural production in the eighteenth century. Efficiency steadily rose during the nineteenth century, and even up to the present time, except as interrupted by the terrible wars of the twentieth century. In Europe, these increases are even clear in the yield records, to say nothing of input-output ratios.

In the United States yields did not rise markedly, except for a few items, until fairly recent years. There are several reasons for this. First of all, land was plentiful and labor was relatively expensive. Alert farm managers were, and are now, concerned as much with reducing inputs as with increasing outputs. A large part of the improvements was designed to reduce labor even at some sacrifice of total output. Then during the latter part of the nineteenth century and the beginning of the twentieth century, when agricultural science was developing rapidly, we were bringing into use millions and millions of acres of new land in the sub-humid and semi-arid regions where yields are normally low. Thus increasing yields on the well-managed land of the humid regions were offset by the lower normal yields in the semi-arid regions. Further, many of our plant breeding programs were concerned with increasing the areas for important crops rather than increasing the yields of those crops in a fixed area. Take corn for example: See how varieties have been developed for areas that formerly grew little or no corn. Now our farmers have many more choices than they did 50 years ago. But despite these strong influences there have been significant increases in average yields of several of the major crops in the most recent years.

When we look at the matter in terms of efficiency, however, the situation is more clear.[3] Between 1800 and 1940 the number of man-

[3] See M. R. Cooper, G. T. Barton, and A. P. Brodell, *Progress of Farm Mechanization*. U.S.D.A. Misc. Pub. 630. Washington. 1947.

hours required to produce 100 bushels of wheat dropped from 373 to 47. The comparable figures for corn are 344 to 83, and we know of the great improvements since 1940. The man-hours for a bale of cotton dropped from 601 to 191 between 1800 and 1940; and we know that they are dropping more rapidly now. According to recent estimates, one farm worker supported about $4\frac{1}{2}$ other people in 1820. And 1820 is not the beginning point by any means; agriculture was much more efficient in 1820 than in 1700. While by 1930 the figure was about 11, by 1940 it was 11.3, and in 1945 it had reached 14.5.

In other words, modern science has not only increased our efficiency but is doing so now at an accelerated rate. Will it not continue? Certainly. And how about the tropics which hasn't even yet a soil science of its own, let alone technology. In fact, there exists now no general research institute in the tropics dedicated to research in fundamental soil science. There is no reason at all to suggest that present results in the tropics, or in the far north for that matter, with technology imported from the temperate regions, are even partially indicative of the future. Soils in the topics are so different from those in the temperate regions that technology can be transferred only to a limited extent.

We in America take our efficient agriculture for granted, at least that one-third of it which is efficient. We have failed to appreciate fully the direct effects of science and technology. But the indirect effects of technology, through the parallel rise of industry, are even less commonly apprecitated. Without industry one cannot expect highly efficient farms. The only exceptions are in the few highly developed areas that are closely bound to an industrial base, like Hawaii, or like Java before the war.

Efficient farming involves machinery, fertilizers, insecticides, fencing, medicines and similar supplies, and often huge dams for irrigation, flood control, and electric power. These are essential for production to say nothing of the living needs of country people.

That needs for these things exist in agricultural communities of subsistence farmers is generally known. But do we know exactly what machines, what fertilizers, and what plant varieties to recommend? We do not, not unless the necessary research has been done on the precise soils or very similar soils elsewhere. Transfers of technology can be made from one area of soil to another area of like soil, but only imperfectly to a different soil. Fundamental soil

science is, of course, universal. But in the applied phases, as we come closer and closer to the actual practices used by farmers, the greater is the difference among unlike soils. Nor can we yet boast of a symmetrical fundamental soil science, not until we have far more research outside of the temperate regions.

Still we do know a lot about soils and how they can be managed for optimum production. Even if we could predict the management requirements of all the thousands of soils in the world for efficient use, what then? In new or backward countries the materials for modern farming can be supplied partly through trade. But aside from trade barriers and political difficulties, two things block much progress along that line: First, a poorly developed agricultural country has difficulty in selling enough, or in getting credits enough, for importing what is really necessary in efficient farming systems. Second, what of the extra rural people—people left over as a community goes from subsistence to efficient farming? The country must either have great resources of new soils for rapid settlement and agricultural expansion or have other new employment for these people.

Thus it seems that no matter where we tackle the problem of backward agricultural areas, we soon run into this intimate relationship between agriculture and industry. Where I have seen backward areas from the Yukon to the Congo, and across Asia, these two must develop together. Industry needs food and raw materials; farmers need industrial products. High levels of health and education are essential for efficiency in both. In countries where people die young, efficiency is bound to be low. The percentage of a man's life when he is able to work is just too small. And he must have a job to work at with enough tools and enough acres.

To accomplish this expansion of industry is much more easily said than done, and done in a way that will benefit the workers and farmers rather than exploit them for outside interests.

Should we be able to see suddenly, tomorrow, efficient agriculture throughout the world, the pattern would be very different from place to place. It would be generally known—not known by just a few—that practices good in one place can be ruinous in others. It would be known that those practices that build up soil productivity to an efficient level, and maintain it there, also give the most efficient production over a long period. Erosive lands would be under a protective cover—not only a protective cover but also a productive cover.

This is a distinction that many of our emotional conservationists fail to make. Of course, we agree with them that we need a protective cover on the soil, but farmers must make a living—we hope a much better living than they have had. Thus the protective cover must be a more productive cover than the one before. This means full utilization of all our knowledge of fertilizers, tillage machinery, drought-resistant and disease-resistant varieties, adapted breeds of livestock, and similar practices. Proper rotations of crops for example, are more important in soil maintenance than the simple mechanical devices for immediate water control.

Farm organizations and community patterns, as well as the individual practices, will vary enormously among the great soil regions. Then, too, what people have to do because of the soil somewhat affects their social customs and ideas, just as their ideas influence their practices and organizations.

Such an ideal world of an efficient agriculture would have plenty of variety in living ways as well as in technology. Uniformity would be impossible; but such differences rather than leading to war, would provide interest and stimulation.

Even a fellow like myself needs to admit that such an ideal world is a long way off. The real world is still more varied. Even on the same kinds of soil, people have approached optimum efficiency at different rates. Some communities may begin with a pattern of ideas and social customs in which technology is quickly accepted. Others have a different pattern and some painful adjustments will be needed along the line. So to the variations of geography must be added those of history.

Can we have an efficient agriculture to meet the food needs of the world? Insofar as he can answer, the soil scientist must give an emphatic "yes." As far as resources and technical knowledge are concerned the upper limit is somewhere above the present food needs of the world, probably a long way above. How far we cannot say. The cultural developments that would accompany the development of these resources might be associated with declining birth rates, but, of course, this is a question for population experts. And these reckonings take no account of the real likelihood that science may soon know how to make at least simple foods, like common sugar, synthetically.

How can all of this be brought about? No one can set down a detailed plan. When the answer is found, it will be seen to be made up of many answers because so many things need doing at once.

Effort toward the goal of abundant food must not prevent or hinder the reaching of other important goals nor should the other values of mankind be destroyed. We must beware of slogans. Food production must be efficient so that farmers have good incomes and can live well—all farmers everywhere. Near the farms must be efficient industries. Above all, if the new world is to be worth working for and living in, the liberties and opportunities of individual men and women must expand.

(1) The people in each community—a country or a distinct area within a country—must learn to help themselves, not by simple neglect, but through whatever programs or devices that need to be used. Improvements that people follow blindly without understanding can lead to short-time spectacular results. But collapse, or tyranny, or both, are likely unless individual responsibility keeps pace with both understanding and need. The slow way of helping people develop their own skill and understanding is, I believe, the fastest way to lasting accomplishment. Many roads lead to tyranny and one must always suspect the quick pictures of "before and after."[4]

(2) Education is essential. Nearly everyone seems to advocate it; yet progress is painfully slow. Maybe it is said too easily; certainly, we expect too much from too little. Millions neither read nor understand the common European languages. Americans expect too much uniformity. Of course men hold certain eternal verities in common, but people have different ways of thinking and different ways of doing things. Some of these differences are necessary; others are mere matters of taste. We need to learn better how to help other people achieve a better life of their own without wanting to change them.

(3) Exchanges of knowledge between countries can go a long way, *provided*, and only provided, that full account is taken of conditions from place to place. Some industrial processes, like nitrogen fixation, can be used over a very wide range of places. Most soil management practices are specific in their adaptability. That is, we need to use narrowly defined groups of soil types as a basis for many exchanges of agricultural technology; for others we may use broadly defined groups.

Then too, one technology often depends upon another, until we

[4] Many sources may be cited but none makes the point more clearly than *Christ stopped at Eboli* by Carlos Levi. Translated from the Italian by Frenaye, Frances. New York. 1947. (Penguin edition, 1948).

find ourselves dealing with a complex pattern of inter-dependent resource uses. Programs for the solution of this kind of problem we have lately come to know in America as the "TVA idea." This idea will have an increasingly wide application as technology advances.

(4) The need for freer trade is obvious. The whole apparatus of international exchange, credit, and finance is vital to the efficient use of resources and to the necessary import of tools and materials by people beginning to improve their farming and to develop their industry. But to buy they must sell in a fair market. Trade is so important that without fair trade, I fail to see how the goals can be reached. But trade alone is no panacea; there must be a great deal besides.

(5) Above all, I should emphasize scientific research, not just applied science or technology, but fundamental research. Possibly I over-emphasize science. If I do (and I do not admit for a moment that this is so) I may be excused because fundamental science has been so badly neglected in discussion of this problem relative to technology, trade, and education. Then too, it is among the verities of fundamental science that men find greatest agreement. The language of science is universal. And it is from fundamental science that technology and invention arise.

Only a little agricultural technology can be transferred from Europe and America to the tropics but the principles of scientific theory can be transferred. The great need in the tropics now is for fundamental research. No first-class institution for such research exists today. Technology appropriate to the tropics must arise on the basis of fundamental research within the tropics.

A new agricultural research program for Alaska is just beginning. The Soviet Union had begun work in the Arctic sometime ago.

In the newly developing countries, rather than simply having many highly specialized experimental stations, the need is for general research institutes with good scholars in all the principal fields associated together as in a great university. Through helping start such institutes can America and Europe give a real impetus to the rise of civilization in the tropics, and at the only possible level,—the level of fundamental science where transfers can be made between regions and cultures.

These suggestions are general, and the results lie far ahead. I should like to make some suggestions of things that could be done

immediately, right now, in addition to the program for fundamental research which should not be delayed another day.

(1) Expansion of fertilizer manufacture and use would have a large immediate effect on crop production. For soils reasonably similar to those where fertilizer is now used effectively, good recommendations and yield predictions are available. On other soils results would be less certain but many economically good practices can be recommended today. Industrial plants for the manufacture of fertilizers *could* be built in fertilizer-producing countries immediately. Some factories could be built in other countries needing fertilizer. Of course, the transportation facilities within some countries would not permit getting fertilizer into all parts for some time. But additional millions of tons of food could be had from increases through the use of fertilizers, fertilizers that would cost less than the food would be worth.

(2) Wide distribution can be made of seeds and planting stocks of proved superior kinds and varieties of crops outstanding for disease resistance, drought resistance, and high yield. Enough is known about soil classification on a world basis to make it possible to go far in this direction even though a perfect job cannot be done without more soil mapping. To a less but still important extent superior strains of livestock can be spread rapidly, expecially through artificial insemination.

(3) Programs for irrigation in promising areas could get underway at once. The necessary soil surveys and engineering surveys may go on concurrently. Fortunately, some work is already underway. Enough knowledge is available to isolate areas of potentially arable soils in rapid reconnaissance surveys and to follow these with detailed soil maps of the land to be irrigated as a basis for planning drainage, leveling, irrigation ditches, and farming systems. Some likely areas are too far from transportation for immediate development. Emphasis can be given right now to those which can be reached conveniently.

(4) Similarly, some of the great unrealized potentialities for hydroelectric power could be developed soon. Such developments are an essential part of any real agricultural improvement in the tropics.

(5) Diseases and insects that destroy crops and livestock may be brought under control at once where methods have been worked out in similar environments. Control methods can be developed

for the rodents, insects, and rots that destroy food in storage and transit.

(6) Immediate expansion could be made of facilities for producing agricultural machinery, including trucks, pumps, and small tools. The machines used in America and Western Europe are not everywhere adaptable. Research is needed to develop suitable tools for farmers changing from a primitive subsistance level to an efficient basis but many significant steps could be taken now.

(7) Many useful simple illustrative pamphlets on the several phases of agricultural technology could be prepared now for use in under-developed countries. They should be adapted for use by the last man who can read in the chain between the heads of governments, down through the officials and clerks in government agencies and trading companies, to the individual farmers.

Progress toward an efficient agriculture depends more upon how much people want it than upon anything else. Perhaps we may say that first it depends upon how much people appreciate their interdependence. Understanding of the problems of food and atomic energy should hasten the day.

The goal of abundant food in the world is by no means a hopeless one, nor can it be reached easily. Whether the people of the world should have enough food or whether they will have enough food are not scientific questions. What soil science says is that if they want it, and if they are willing and able to develop the necessary social institutions, they may have it.

DISCUSSION*

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A synthesis of the two excellent papers presented by Messrs. Taeuber and Kellogg leads to the following rather depressing conclusion: There is only a very small probability that the three-fifths of the world's peoples that live in "areas where famines and epidemics, chronic malnutrition and debilitating disease" erupt periodically, will have a better diet by, say 1975, than they had in 1935. This is a gloomy prediction; yet the evidence in the two papers seems to me to support it strongly.

I reach this conclusion despite Mr. Kellogg's estimate that from a physical and biological standpoint output increases are possible that will permit an important improvement in per capita diets during the next decade

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or two. Mr. Kellogg emphasizes that the physical and biological possibilities can be achieved only "*if* the political and economic barriers to effective soil use were somehow removed." I shall try to appraise the important political and economic problems that may limit possible increases in world food output.

The first set of economic and political barriers to increased food output is due to the geographic location of the new lands that may be developed for agricultural purposes. As Mr. Kellogg notes the new lands "are off our present routes." More specifically the new lands are far distant—in miles, in economic costs of movement and in political control—from the peoples subject to the greatest population pressure. Most of the hungry peoples of the world are in Asia. Most of the undeveloped lands are in Africa and South America; important amounts may be found in northern Russia, including Siberia, and in northern North America. The Asiatics are not now politically welcome as migrants into any of these areas. Even if there were no political barriers to migration, the sheer magnitude of the necessary movement would seem to make it impossible. A gigantic migration would be necessary to reduce the Asiatic population to a degree permitting a significant improvement in the diet. Indeed, it is doubtful if migration alone, without significant social, political, and economic changes, that will reduce fertility, could occur fast enough to reduce the population in the more thickly populated parts of Asia. The net effect might well be a reduction in mortality with no change in the fertility.

The second set of economic and political problems arises out of the necessity of industrializing the poorer nations. If migration to the undeveloped lands is impossible, the poorer nations must look to trade or to improving their own agriculture as the means of improving their diet. Both trade and improvement of domestic agriculture depend upon industrialization. The capital outlay for any significant industrialization of India and China staggers the imagination. At pre-war prices the U. S. had an average per capita investment of $400 in manufacturing plants and steam railroads. This probably was no more than half of the total investment in our industrial machine, yet to achieve this per capita investment in China and India would require roughly $350,000,000,000. The huge numbers that are involved in the poorer nations constitutes a significant drag upon the possibilities of improvement, even through industrialization.

Even if the industralization process is seen in a more modest focus, it is not at all certain that political conditions in either China or India are conducive to the necessary capital accumulation. Incomes are so low as to place stringent limits upon aggregate savings. Politically, China is so unstable as to be unable to attract outside capital except as a gift from the United States, while the political division of India and the possibility of civil strife will make outside capital hesitant and available only at relatively high rates of interest. Other of the overpopulated areas are in a political turmoil, making it very difficult to attract capital.

A third facet should be mentioned. Much of modern agricultural technology does not economize land and thus increase output per acre. Its basic function is to economize on labor, as Mr. Kellogg recognizes. European

agriculture, largely because it uses so very much labor, gets larger yields per acre than we do in the U. S. The mechanization of European agriculture would reduce aggregate output. Some land would have to be withdrawn from cultivation, while other land could only be farmed much less intensively than at present. Much the same result might occur in other parts of the world.

Finally, it is not at all clear that there will be any significant increase in fertility control in the overpopulated areas of the world in the next quarter century, or for the next half century for that matter. If industrialization occurs at all, it will occur very slowly. The general change in values that accompany urbanization and higher incomes operate slowly to change viewpoints on family limitation. This is one of the important points stressed by Mr. Taeuber. Even though the trend toward industrialization and urbanization will not reduce fertility for two generations or so, the impact upon mortality will be rather immediate. Consequently it is not impossible that we will see a considerable improvement in sanitation, health facilities and related aspects of Western culture without any improvement in the diet. To a very real degree the history of the Philippines from 1900 to 1940 reflects just that—an important amount of capital investment, significant improvements in health, and twice as many people in 1940 as in 1900 having available to them no more than twice as much food in the aggregate. During this slow transition to industrialization it is not at all clear that food supply can keep ahead of the rapidly increasing population due to maintained fertility and a mortality that can and does decline rapidly.

Is it likely that very much new land will be brought under cultivation in the next quarter century? It seems to me that the answer is in the negative. The economic cost of development is very high. Unless the terms of trade are very favorable toward agriculture, there will be little incentive from an economic standpoint to make the necessary investments. And the terms of trade can turn in favor of agriculture only as one or more of the overpopulated areas become large importers of agricultural products. This in turn can materialize only as a result of industrial exports due to a significant degree of industrialization. Such is not likely to occur within the next quarter century.

This leads to a final point. Even if the world's population is now increasing at a rapid rate, there is no evidence in what Mr. Taeuber presents to indicate that the countries making up the Western Trading World are likely to long have an expanding population. Consequently, three-fifths of the people of the world may have seriously inadequate diets while at the same time the terms of trade may be very adverse for farmers in the Western Trading World. The supply of food in this area will continue to increase with technological developments. The only important factor increasing the demand for food will be increases in per capita incomes. Given the low income elasticities for food that seem to prevail among the more well-to-do in the world, it is unlikely that real incomes can increase rapidly enough to fully offset the change in supply.

This situation will present important international political issues that

will be most difficult to resolve. Part of the world will have a surplus of food; most of the rest will have millions of people with inadequate diets and will be so poor as to be unable to buy the food. The obvious solution is to move the surplus food from the one area to the other, either free or at low cost. But this is no solution at all. The Western World will simply have too many resources in agriculture; some should be shifted out. The recipient areas will receive no permanent gain unless something is done to bring fertility under control. Otherwise the food would be dissipated through an increase in numbers and no permanent improvement in the diet or well-being would materialize.

When we attempt to determine if population will outrun the food supply, we are really trying to determine if a significant increase in real income can be achieved. This is an extremely complex phenomenon about which we know all too little. This session has dealt with one of the most important as well as the most difficult of the social, political and economic problems that confront the world today. It is particularly important that scholars in the United States increasingly devote their energies and talents to this issue. If the United States is to maintain the role of economic and political leadership that has been thrust upon it, it must help the poorer nations to find a solution to their problem of poverty.

DISCUSSION*

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Dr. Taeuber and Dr. Kellogg have contributed much to a better understanding of the factors upon which future changes in world population and food production will depend. A more widespread recognition of the facts they have presented is greatly needed at the present time for at least two reasons: First, it is necessary if we are to take intelligent action to improve the per capita food supply, and second, it is necessary to correct some of the mistaken ideas that many popular writers on this subject have given to the general public.

The thinking of the popular writers to which I refer is something like this. World population doubled in the last century and probably will do so again in the next. The land area of the earth suitable for cultivation is limited. Less land per person is interpreted to mean less food per person. It is not denied that scientific advances may raise productivity per acre. But some contend that this will be more than offset by permanent loss and depletion of soil and water resources. Some go so far as to maintain that it does not matter what happens to food production because population will increase up to the limits of food supply anyway. They believe the only solution is more control over population growth.

What does Dr. Taeuber say about population trends? Perhaps most significant is his observation that modern increases in population are a

* A discussion given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 13, 1948.

function of control over mortality and that there is no evidence to support the view that increases during the century before World War II in any part of the world reflect increases in fertility. Perhaps few people realize that population growth in the last century was the result of a more rapid decline in mortality than in fertility. Control of fertility, which generally is associated with industrialization and urbanization, is the reason why population growth is leveling off in many countries. The fact that more people are living longer and more productive lives is, of course, a mark of progress.

It is apparent from what Dr. Taeuber has said that world population will continue to increase, but he does not say how much within a specified length of time. Forecasts of population growth must be based on assumptions with respect to future changes in fertility and mortality. The validity of these assumptions will depend upon the adequacy of the analysis of factors that may bring about changes in the levels of fertility and mortality.

It is noteworthy that one-fifth of the world's population—the one-fifth which has the highest standards of living and the lowest levels of mortality and fertility—still is expected to be stationary or declining within a few decades, and that another one-fifth is approaching this point at a rate which will bring it there within a generation or two.

But for the remainder of the world, demographic data are so incomplete that a projection of population change can be no more than an assumption. Large increases in the population of these regions have been forecast on the assumption that mortality will be reduced first and that fertility decline will lag behind as it did in other countries that have experienced industrialization and advancing living standards. But one might also assume that if such countries as China and India are to make much economic progress, lower levels of fertility and mortality will come about simultaneously.

To me, all of this adds up to a much lower rate of population growth in the next century than we had in the last.

But suppose world population reaches the 3 billion mark by the year 2000 as compared with 2.3 billion at present. Would it be possible to provide them all with adequate diets? I am sure that Dr. Kellogg's answer would be Yes. He has told us that, from a physical standpoint, there is no reason why the increases over the prewar food supplies that are estimated in the "World Food Survey" by the Food and Agricultural Organization as necessary to improve diets for the population expected in 1960, cannot be met.

It is worth while to note the emphasis Dr. Kellogg gives to the fact that estimates of the land area of the world that is suitable for crop production must consciously or unconsciously be based on assumptions regarding economic conditions. This may be one reason why the estimates vary greatly. For example, Carl Alsberg in *Limits of Land Settlement* in 1937 estimated that 6.4 billion acres could be used for crops if necessary. O. E. Baker in an article published in 1947 in *Maryland*, the alumni publication of the University of Maryland, estimated that about 4.4 billion acres is

suitable for wheat, rice, or other cereals. Recently Pearson and Harper in *The World's Hunger* concluded that only 2.6 billion acres, or about the same as now cultivated, could be used to grow crops. On the other hand, Dr. Kellogg indicates that 1.3 billion acres, an increase of 50 percent, could be added to the present cropland area. Besides land in crops, permanent pasture is an important source of our food supply. Alsberg estimated that land area suitable for pasture was about the same as the 6.4 billion acres of potential cropland.

The possibilities of expanding food output from the land now in use by raising crop and livestock-product yields probably are much greater than those that are possible by extending the area of land use. Dr. Kellogg indicates that a 20 percent increase in crop yields of the world, or about the same as was estimated recently for the United States, is possible by greater application of known techniques. Another approach might be to estimate the food potential if cropland is used as intensively and with as advanced methods as in some of the most highly developed agricultural countries. If productivity per acre averaged as high as in prewar Germany, total food output probably would be doubled or tripled. Of course, intensity of land use and the food output per acre will depend considerably upon economic conditions with respect to market demand which prevail over a period long enough for the necessary production adjustments to be made and for adequate returns to be had from the necessary capital investments. The intensity of land use that is profitable obviously will continue to differ throughout the world. In the several areas it will depend upon the supply of land and the level of demand for agricultural products in each country.

Dr. Kellogg did not say much about the extent to which depletion of soil and water resources has reduced the area suitable for agricultural use. But I am sure he would agree that land should be used so that its productivity is not permanently impaired. He probably also would agree that, so far, taking the world as a whole, losses in productivity caused by reduction in the native fertility of some soils and the permanent destruction of others have been offset many times by advancing farm technology.

This leads to the conclusion that the food potential of the earth is great enough to provide food enough for all the people that probably will inhabit the earth in the next century if that potential is properly developed. But it does not mean that this objective will be achieved soon. Our hope is that we may be able at least to remove the social, economic, and political obstacles to such an extent that progress in this direction will be more rapid that it has been in the past.

INTERNATIONAL FOOD AFFAIRS

Chairman: J. F. Booth, Department of Agriculture, Canada

THE FOOD SITUATION IN EUROPE IN RELATION TO THE WORK OF FAO*

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IN THE early summer of 1945 a rather significant meeting was held at Lancaster House in London. Lancaster House used to be one of England's ducal residencies; it then became the London Museum; and finally the meeting place of international conferences. On that occasion in 1945 it was housing the first meeting of the EECE—the Emergency Economic Committee for Europe.

I had the privilege at that meeting of proposing the establishment of a Food and Agriculture Sub-Committee. That Committee met almost every other week for nearly two years until its functions were taken over by other organizations. The EECE was the first cooperative post-war effort at European reconstruction, and the Food and Agriculture Sub Committee was the first attempt to deal on an international scale with Europe's food and agriculture problems.

Later in 1945 the FAO itself was brought into being. That took place at the Quebec Conference in October of that year. In the early months of its existence is was not able to render very much direct assistance to Europe. It was busy with its own internal organization—recruiting its staff and planning the field of its activities; but close cooperation was rapidly developed between FAO and the Food and Agriculture Sub-Committee of EECE. This was strengthened when FAO took over responsibility for what was called the Combined Working Party. This was a committee operating in London under the auspices of UNRRA, but containing representatives of the United States and British Governments, as well as of the economic missions or other representatives of European governments at that time established in London. That Committee had been endeavoring to assess the needs of European countries, released or being released from occupation, and to determine the supplies of food and other commodities available.

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In August 1946 the FAO European Office was established at Rome, and since then it has played a significant part in the restoration and development of European agriculture. The Rome Office is under the control of the Director-General's personal representative for Europe and has a small administrative and secretarial staff. Its technical officers are assigned from the technical divisions at headquarters in Washington for longer or shorter periods according to the specific work they are sent over to handle. In this way centralization of policy is combined with local and regional executive action in conjunction with European member governments and European organizations.

The ECE—Economic Commission for Europe—was set up in March 1947, and the EECE disappeared after a period of activity which will remembered with appreciation by most European countries. When the ECE was established, the activities of the EECE Food and Agriculture Committee were transferred to the FAO office at Rome. In order to maintain liaison with ECE, a sub-office FAO was opened at Geneva, where FAO personnel was able to work on European food and forestry problems with members of the ECE secretariat.

Later in 1947 another organization came into being in Europe, also directly concerned in food and agriculture problems—but this time covering only a limited part of the continent. It was the OEEC, set up to represent the 16 countries which are the beneficiaries of what they call in Europe the "Marshall Plan." This body—the OEEC—has its own Food and Agriculture Committee and is in direct touch with ECA in this country in regard to the operation of the Marshall Plan and the restoration and development of European food and agriculture which that plan makes possible.

The Food and Agriculture Organization, through its European office at Rome and its sub-office at Geneva, is now in a position to cooperate with these other economic organizations in Europe, as well as to render assistance to the European countries themselves. Nevertheless, the field in which FAO can render assistance is a limited one. It cannot order particular policies to be adopted; it can only advise, educate, and persuade. It cannot embark on the executive functions of purchase and procurement in order to stimulate output and equalize distribution; it can only recommend, demonstrate, and discuss.

Nevertheless, even though FAO's activities must largely be ad-

visory and consultative, it can render very great assistance to organizations with wider powers as well as to governments willing to take advantage of its technical experience and advice. In particular the machinery established in Europe for utilizing the grants made by ECA can enjoy all the service and advice which the economic and technical staff of FAO is in a position to offer. Moreover, the European governments themselves, in their own executive activities, can put into operation the plans and suggestions which FAO brings to their attention, either in direct contact or through local conferences, committees, and other meetings.

In developing its plans for assisting European, and indeed all other member countries, FAO has a three-fold policy. There is first the problem of today; there is next the problem of the coming five years; there is the problem of the coming century. A kind of "This year—Next year—Sometime—" program.

Some of the activities of FAO are designed to render immediate assistance—such as the allocation of food and agricultural commodities in short supply through the machinery of the IEFC, or the preparation of programs for meeting requirements of agricultural machinery and other equipment.

Other activities cannot come to fruition within less than the next four or five years and often longer—such as the elimination of animal diseases, the improvements of strains, and the reduction of losses due to infestation.

Other activities will produce their results only over still longer periods. These are the extension of irrigation, designed to bring large new areas into food production, afforestation and reafforestation achemes, designed to counteract soil erosion and restore fertility to the earth as well as to provide the supplies of timber which mankind will need in the future.

In all these these fields FAO is in a position to render assistance a to Europe, either directly to the individual countries or in cooperation with such organizations as ECE, OEEC, and ECA. FAO can act as the doctor, diagnosing the disease, as well as the physician prescribing the remedy. Indeed, this exactly describes FAO's function.

Its Nutrition and Economics Divisions measure the present food standards and the economic wealth and activity of the country. It is the determination of food needs and the economic situation conditioning effective demand which are the justification for the advice

which FAO is able to render in regard to agricultural production and the distribution and utilization of food. Each area and each country has its own nutritional and economic problems. The standards of calory intake and the adequacy of supplies of protective foods for the different sections of the community are the measure of the supplies needed to produce health, happiness and wealth. This represents the diagnosis which FAO is in a position to carry out. Thereafter the Agriculture, Forestry, and Fisheries Divisions advise and assist in regard to specific remedies, while the Rural Welfare Division studies and helps in the development of all the rural amenities necessary to insure that food production is carried out as efficiently and happily as human beings can design.

But before we begin to consider what FAO can do in Europe today, either directly with member governments or in cooperation with the international organizations concerned, it is necessary to put the patient into the consulting room and diagnose the disorders from which she is suffering.

Europe emerged from the recent war with losses and damage which were not fully realized at the time. Indeed, most European governments and the great majority of the populations expected a rapid return to the conditions of 1938, and with all the new technical developments which had resulted from wartime economic activity, an even quicker recovery than that which took place after the first World War. There was a short honeymoon period during which controls were jettisoned or plans made for an early restoration of free activity, but when the facts and figures were collected, the economists, nutritionists, and politicians began to change their views. Unfortunately the facts and figures were not easy to collect. The statistical services of many European governments had been hopelessly disorganized by the war. Internal transport and communication were slow in restoration. Farmers were reluctant to to disclose their supplies or output for fear of their being taken away. The whole atmosphere of wartime occupied Europe persisted, when it was a patriotic duty to mislead the occupying forces regarding the food position. Consequently Europe was slow in assessing her true situation.

Indeed, it was not until the United States made that unparalleled gesture of the European Recovery Program that the countries concerned committed themselves to definitive figures for present and future years. That gave the first real forward appreciation of

the position for a large part of Europe since the end of the war. That appreciation has been extended and amplified by the "Survey of the Economic Situation and Prospects of Europe" issued by the ECE this year and by the FAO report, to which I shall refer later, "European Programs of Agricultural Reconstruction and Development."

Had the FAO been in existence for a number of years and been equipped with a fully operating European office it might have been able to bring the facts of the situation to the notice of member governments at an earlier date. But lack of information within the European countries themselves would have been a great obstacle in the first post-war years. FAO did call urgent food conferences, first in Washington in 1946 (in continuation of the EECE Cereals Conference in London in the spring of 1946), and again in Paris in 1947, to draw attention to the serious food position of the world and particularly that of the European countries.

Perhaps the most comprehensive (and by no means reassuring) appreciation of Europe's present and prospective outlook in the field of food and agriculture is that contained in the FAO publication to which I have referred—"European Programs of Agricultural Reconstruction and Development." It has already secured wide interest and it is unnecessary to repeat its analysis and findings in detail. This publication gives the position of today, the probable outcome in 1950–51 of the present plans of the European countries, and compares them with the position which existed before the war. Even assuming that the plans of the European governments materialize, the outlook, though improving, is still unsatisfactory, and it will be much later than the early 50's before Europe re-establishes, for its increasing population, the standards of living of the late 30's or improves them to the higher standards already operative in the United States and other more prosperous countries.

At the present time only two or three European countries have restored or surpassed the pre-war levels of food production. Half a dozen, mainly Western European countries, are approaching their pre-war figures. The remainder, mainly Eastern European countries, still fall short by a quarter or a third of their pre-war food output. Had populations remained stationary, this would have been unsatisfactory. But populations, in spite of war losses, are forging ahead at an unexpected rate. Consequently Europe has still a long way to go before it can even restore its pre-war average

standards. It has, in addition, its balance of payments problems, which, but for the temporary assistance of the European Recovery Program, would call for still higher production in Europe to prevent widespread famine during the next few years.

All the European countries are developing plans substantially to increase food production. If they materialize, Europe as a whole will almost have re-established its pre-war acreage of cereals by the early 50's and have somewhat exceeded its pre-war acreage of sugar and vegetables. But owing to shortage of equipment, fertilizers, and similar factors, the actual output of cereal crops will be less in 1950–51 than it was in the immediate pre-war years. And this, after the stimulus to European production produced by the present realization of its serious plight and the assistance provided by the European Recovery Program of the U. S. A. By 1950–51 Europe will have restored its livestock population, except possibly in regard to horses, but its output of meat and dairy products will, by the early 50's, still be less than it was in the pre-war years. Fish production, on the other hand, should be well in excess of the pre-war supply.

With the balance of payment problem pressing heavily upon Europe's import program, European governments are making strenuous efforts to increase their own cereal production. But as their cereal acreage goes ahead, and as the output of that acreage is increased by improved methods, mechanical assistance and better strains, population, too, is advancing. There are more mouths to be fed.

Moreover, the amount of additional land in Europe suitable for cereal cultivation is limited, so that any great expansion of acreage inside Europe is improbable, except possibly at the cost of a greatly reduced livestock population. On the basis of the FAO report on the European programs, it will be seen that Europe's gross net imports of cereals for 1950–51 are programed at more than 15½ million metric tons. This is after providing for the complete restoration of the pre-war cereal acreage in Europe. An import of 15½ *million* tons of cereals in 1950–51 is actually over six million tons more than the average pre-war imports.

There are several reasons for this great import increase in need. Even with the restoration of the pre-war acreage, indigenous production, owing to shortage of supplies equipment, etc., is expected to be 2,300,000 tons below pre-war. Furthermore, Europe is not

counting on recovering its pre-war rice imports of one million tons. Its population will be 5 percent larger, and some countries will still be short of other foodstuffs.

One of the most serious problems with which Europe will be faced during the coming five years is therefore whether the world will be able to supply it with this enormously increased supply of cereals which it needs, and if so, whether Europe will be able to pay for it in the currencies which the sellers will demand.

In the estimates of world cereal supplies made by FAO in its publication on European programs, doubt is expressed whether there will actually be available in the world in 1950–51 for shipment to Europe the 15½ million tons on which the European program is predicated. If this supply is not available and if the growing populations of Europe are inadequately nourished, then the industrial programs, too, will fall short of achievement and the European economic problems be still further aggravated and their solution still further postponed.

Much the same considerations apply in regard to other foodstuffs which Europe needs, particularly oils and fats and meat and livestock products. There is no doubt, therefore, that even with the assistance of the supreme effort which the United States is making through the European Recovery Program, Europe has still many problems to solve before its teeming millions are restored to their pre-war standards of living or brought to happier and fuller lives.

FAO's policy in regard to these problems must be first to discover where and in what fields additional production can be planned and then to help and advise in its achievement. The following are some of the measures FAO has recently adopted or is adopting in Europe. Others of a similar character will follow:

A meeting was sponsored at Bergamo, Italy in the summer of 1947 in which plant breeding specialists from nine countries met to consider ways of utilizing hybrid corn for the benefit of European agriculture. This was the first such meeting in Europe and marked the beginning of a considerable increase in maize production, particularly in southern portions of the Continent. FAO has followed up this meeting by supplying hybrid seed for experimental tests and also by supplying open pedigree inbred line seed for the use of experimental breeders. Most of this seed has been donated either by State or Federal Experiment Stations in the U.S.A. and Canada and by private breeders. Another meeting will be held dur-

ing the coming winter to enable the workers engaged on this program to compare the tests made in various countries and to lay plans for the breeding programs to be carried out during 1949. Attention is given in this program not only to maize for grain production but also to silage varieties.

A meeting was sponsored in Weybridge, England, during the summer of 1947 in which veterinary workers from thirteen European countries participated. The main purpose of this meeting was to acquaint workers in countries that had been shut off by the war with the latest developments in the production of veterinary vaccines and serums. A further meeting is planned on animal health problems in Krakow, Poland, in November 1948. This meeting will have as its primary object a discussion of diseases that are of particular importance in the Eastern European countries and will deal not only with methods of producing vaccines and other control agents but with the field control of these diseases. Workers both from the Eastern European region and from Western Europe and FAO headquarters will join in the discussions.

A world-wide meeting on the control of infestation in stored food products was held in London last year and many of the European countries participated. The technical material presented at this meeting has been published in FAO Agricultural Studies, Series No. 2. A further meeting of specialists is being held in Italy at the present time to discuss the specific problems of reducing losses of stored grains in European countries and to acquaint technicians from various countries with the latest developments in this field. Attention will be given to commercial and also to farm storage problems and, incidentally, some material will be presented on other aspects of pest control.

At the present moment a conference is being held in Italy on soil conservation to which the interested European governments have been invited. The latest developments to combat erosion and increase fertility are being made avaliable to the members of this conference in the expectation that they will be adopted in various parts of Europe. Two advisers are being provided to the Government of Italy to assist them in setting up a nation-wide conservation program and improving the management of their grazing lands.

But FAO is helping Europe by the activities it undertakes in other parts of the world, as well as those which it organizes inside

Europe itself. This coming fall there is to be a conference on rinderpest at Nairobi, in East Africa, to which will be invited animal specialists from interested parts of the world, particularly Southeast Asia. If the outcome of this conference results in the adoption of preventive and remedial measures in Siam and other parts of Asia, the draft animals there will be more efficient, and increased supplies of rice will be produced. With an increase in the output of rice in Southeast Asia, there will be less demand for wheat and flour by India, China and other countries, resulting in larger supplies of Australian wheat and flour being available for European countries. If FAO can assist in the development of oil seed production in Africa, this will make available to Europe supplies of food from areas with which balance of payment difficulties do not exist. There are many areas where food production can be developed which do not involve the payment by Europe of those precious dollars of which she is so short.

It may even be that ECA can, in certain cases, render more direct assistance to the European countries in their recovery programs by assisting the development of food in such areas than by giving direct assistance to the European countries themselves. Australia still has vast areas capable of producing cereals and livestock products. Southern Rhodesia could carry a large livestock industry. Oil seed production could be developed on a much greater scale in both East and West Africa. Rice production in West Africa on a mechanized basis might restore those million lost tons of rice imports which Europe received before the war.

Although FAO cannot itself undertake these developments—it must leave them to the interested countries—it can, however, assist and advise in their development and put at the disposal of the countries concerned the best experts in the different fields. In such a way FAO can and does help European reconstruction by activity outside Europe itself.

So much for the immediate future in the fields of food and agriculture, and it is perhaps sufficient for European countries to concentrate for the moment on the problems immediately besetting them. With their growing populations and their balance of payment difficulties—difficulties which will certainly not be solved during the present decade—they have a serious enough problem in trying to make both ends meet during the coming years and restore the standards of life which existed before the war. But to those who

look ahead, that is not sufficient. If European civilization is to survive, it will not survive on the basis of a struggle to maintain the inadequate standards which were achieved in the 30's. Populations seeing the standards of prosperity prevailing elsewhere in the world will not be satisfied permanently to accept something lower for themselves. The rest of the world is itself rapidly industrializing and no longer willing to exchange its foodstuffs on such favorable terms with Europe as it did in the past. The whole balance between industrial products and agricultural products may be changed.

The United Nations Department of Economic Affairs has just issued a study of selected world economic indices. These show that while the total world supply of goods represents 110 percent to 115 percent of the pre-war figure, agricultural production is about 93 percent of pre-war, and industrial production between 130 percent and 135 percent of pre-war. The relative lag of agricultural output has resulted in the relative increases in prices of agricultural products. This means that the terms of trade have turned against the industrial countries, a fact of great importance to European countries anxious to exchange their industrial products for the foodstuffs they need to feed their populations and raise their standard of living.

If Europe is to obtain the food she needs on the best possible terms in exchange for her industrial output, she must deliberately plan her export trade to the food-producing countries and particularly to the areas where it can be produced more cheaply than is at present possible in the western world. Africa, the Middle East, parts of Asia, and Australia may be the areas in which capital development should be undertaken on a long-time basis to provide Europe with the food she requires in return for industrial products.

Inside Europe, too, there is the possibility, by the development of east-west trade, of industrialization and increased food production through more intensive methods, marching side by side. The ECE has just released an analysis of east-west trade in Europe, drawing attention to the possible increase in food supplies from Eastern Europe in exchange for the output of Western European industry. ECE estimates that by improved methods of production, cereal supplies in Eastern Europe might be raised by 12 million tons. Moreover, they point out that this need not be prejudiced by increased industrialization in Poland, Yugoslavia, and Hungary, assuming that populations do not rapidly increase. It is, however,

true that the first consequence of industrialization has usually been a rapid rise in population, with a slowing down as industrialization leads to higher standards of material wealth.

In the past, the world, and particularly Europe, has had three food arises. The first came during the Napoleonic wars and was remedied with the development of intensive British agriculture and a restoration of transportation in the early 1820's.

The second period came about the middle of the century, when the rapidly increasing populations of Europe were outgrowing their resources. This crisis was solved by bringing into the world markets the vast food supplies of the American West.

The third period started about the end of the century and was not really solved until after the first World War, when large-scale farming in Australia, Argentina, and Western Canada again brought a new supply of food to the industrial countries of Europe.

We now seem to be approaching a fourth crisis, and without the possibility of the remedies which cured the three previous crises, The unused lands of the world capable of food production are no longer unlimited. Moreover, many of the existing lands are losing their fertility as the result of centuries of misuse and soil erosion and may have to be rested for long periods before they can provide their present outputs over a long future period. And in the meantime populations are increasing at an alarming rate, while countries which previously supplied Europe with food are industrializing themselves in the vain hope that industrialization alone will mean a higher standard of life. There is, therefore, a real danger that Europe may not find an increasing outlet for its industrial products —even in the new areas of Africa, the Middle East, Asia, and Australia—and be driven to produce more and more of the food it needs. More mechanization, more up-to-date methods of farming, and increased use of fertilizers will all be needed in Europe. In these fields FAO will be able to render help and advice.

International commodity agreements, such as the recently stillborn Wheat Agreement, will be necessary if the world is not to get completely out of balance. To leave commodities to find their own level through the free exchange of the price mechanism in such circumstances would, in the long run, be disastrous to food producers and food consumers alike. During the transitional period, until new sources of food are available, some controls and much planning will be unavoidable. Europe in particular will need such help and assistance if she is to survive the coming years.

But while Europe's land resources must be developed efficiently and with wisdom, the sea may provide new resources awaiting development. This will be particularly important if the pressure of population leads to greater and greater intensification of food production, and therefore involves an increasing drain on the soluble nutrients of the land.

While there may be vast deposits of phosphorus, potassium and other elements which enter into fertilizer in the earth's crust, to some extent the procurement of these chemicals is an extractive industry and the costs of getting them will become greater and greater as workable deposits become scarcer and scarcer.

To all intents and purposes, it is true that matter cannot be destroyed, and in a sense nothing is really ever wasted. On the other hand, even though not wasted, its availability may change. For instance, the continual inundation of the earth by the greatest of all solvents—water—has the effect of washing the end products of life into the rivers, the draining systems and eventually into the sea, so that in the very long term, man must turn his attention to this great reservoir of energy and materials, and reclaim them for himself and the land. He may do this in two ways. First, he might utilize to a much greater extent the living products of the sea, and second, he might use it as an inexhaustible source for some of the chemical elements which he needs to maintain fertility of the land. And so the oceans, which first gave rise to life, may eventually become the ultimate source of its maintenance.

Of course, the whole position in regard to food, clothes, and housing may be completely changed as a result of scientific developments. Atomic energy has its incalculable benefits, as well as its dangers for mankind. We have already found out how to synthesize edible fats, and thus to produce calories from sources other than the land. We have not yet succeeded in synthesizing proteins, but who knows what is still unrevealed in the womb of time? Scientific developments may alter all our conceptions of food problems and the resolution of Europe's difficulties.

For the present, however, we cannot count on such unknown factors. Europe must be fed, clothed, and housed, and the land is as yet the only source from which she can obtain most of what she needs. During the last 60 years, the world has seen two complementary tendencies. We have been taking the food to the people and the people to the food. Europe has sent her millions to the western world to produce food there, not only for themselves, but for the

millions who remain behind. There are still some lands where more food can be produced, crying for population. But these lands are limited. Moreover, these very lands insist on developing their own industrial resources, so as to be less dependent on imported supplies. Europe must develop her own supplies intensively, expand east-west trade so that food production within the continent can balance industrial output to a greater extent than at present, and encourage some of the population which cannot be fed at home to find a home in other areas where the needed food can be more easily produced.

These are long-term considerations. They are, however, problems with which FAO is concerning itself and on which it will, from time to time, report to its member governments and collaborate with other international bodies. FAO will continue to diagnose not only the immediate ills of its patients but also the potential ills they may suffer as circumstances change. And it will endeavor to devise and provide the remedies for present and future ills.

Its economists, its nutritional experts, its technical workers, and its scientists are already actively engaged in many countries directly with the governments concerned and also in cooperation with the European organizations, such as ECE and OEEC. With them it will labor to help Europe through its present difficulties and to find a solution for the vaster problems which may well mean life and death to the coming generations.

ISSUES IN AMERICAN FOREIGN FOOD POLICY*

HAROLD B. ROWE
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EXHAUSTIVE treatment of this topic would be a far more ambitious undertaking than I am prepared to attempt. I am interested in the many important problems which it suggests. From observation of events during and since the war, I have perhaps gained some familiarity with a few of these problems. But my direct participation in this area of government activity was brief, intermittent, and is now sometime in the past. I have had no opportunity for really intensive study of current developments. In assigning the topic to me under these circumstances, I understand that your program representatives mainly desired a brief review of a few selected aspects of the developing situation, which would reemphasize some of the important difficulties and problems confronting the United States in relation to its participation in international food affairs.

Events during and since the recent war have thrust the United States into a position of world leadership where its actions may be decisive in determining the future course of international economic and political relations. Under conditions of today, which offer so many striking contrasts to those envisaged for the postwar world, constructive leadership requires forward looking decisions that are both positive and consistent on a great many fronts.

But the United States has lacked experience and in other important respects has not been well equipped for this relatively new role—limitations which sometimes delay the complex process of policy determination and render the outcome uncertain. In its relatively short previous experience as a world power, this country participated in world affairs intermittently as matters arose which were recognized as affecting the national interest. Moreover, this participation was often somewhat negative in character as contrasted to the positive requirements of leadership, and was conducted upon the basis of independent decisions with respect to the succession of problems which arose. Against such a background it is understandable, perhaps it should be recognized as inevitable,

* A paper presented at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 13, 1948.

that earnest efforts to fulfill the newly assumed responsibilities of leadership should reveal defects of omission and commission, contradictions, conflict, and lack of continuity that appear almost as characteristics inherited from the earlier experience.

That the United States has been active in international affairs, and that this activity has had sincere support from the electorate cannot be denied. In fact one limitation may arise from recurrent excesses of public enthusiasm for measures that will not be supported in the long run. But these have their counterparts in other instances of public misunderstanding, scepticism, and even indifference which contribute towards delay in obtaining support for necessary action—as occurred in the evolution of policies of recovery aid to European countries. Too often, of course, these are attributable to overstatement and understatement by the government in seeking support for its programs. Both contribute to further widening of the gap between government decision and public support.

Regardless of the support for positive participation and leadership in international affairs that has been apparent, we must not ignore the fact that the country retains a solid core of isolationism. Sometimes evidence of this appears in the demands of groups who quite probably are unaware of its implications and certainly would resent use of the term in characterizing their views. Closely related, if not identical, are the powerful pressures exerted by special interest groups which, especially in election years, exert an influence upon government decisions out of all proportion to their real importance.

Further limitations upon actual performance arise from observable defects in the mechanism of government for formulating the decisions required. Not only does the constitutional structure divide responsibility and authority as between the executive and legislative branches in such a way as to hamper the effective handling of many problems, but the executive establishment has developed along lines which multiply the possibilities for confusion and contradiction, especially in the conduct of foreign economic affairs. One rather conspicuous result is the tendency to obscure the important interdependence of activities undertaken in the domestic and foreign fields.

Many of these limitations may be observed in the handling of food matters included in, or related to, our foreign economic and

political activities. During the first phase of active defense preparation in 1940 and the early part of 1941, administrative policy amounted to a denial that there were significant food aspects to this country's problem of preparation for possible war; except as steps could be taken to increase agriculture's share in the economic benefits from expanded defense activity and compensate the further loss of outlets for agricultural exports that was anticipated. Even the measure of encouraging a moderate expansion in pork production to cover prospective increases in demand became at times a topic of bitter controversy, though it offered an outlet for feed supplies that were then looked upon as burdensome surplus.

Such controversy disappeared after the inauguration of lend-lease, and during the first two years of United States participation as an active belligerent the pendulum swung far towards the other extreme. For a time, willingness to impose domestic sacrifice and accord priority to lend-lease export requirements may have been over-emphasized in statement if not in practice.

As the war progressed to the point of liberating allied territories from enemy occupation, the large foreign policy significance of economic assistance, including lend-lease and relief exports of food, was stressed. Promises were made which were over-enthusiastic and unrealistic if not actually irresponsible. But officials responsible for such matters did not use their influence in seeing that necessary steps were taken to fulfill these promises, at least not until it was too late to significantly affect actual performance. As one evidence of this, financial requirements were not always anticipated or co-ordinated with production, procurement and supply activities.

Of more importance, however, was the substantially independent food policies which resulted in inadequate provision for supplying the export programs. Many considerations influenced this outcome; among which an unimaginative conception of the problem, concern over the post-hostility price of farm products, political timidity in the face of domestic market demands for more food, and what seemed at times to be a fundamentally isolationist outlook which could not comprehend the possibility of public support for continued food shipments after the conclusion of hostilities, collectively were not unimportant. But the developments in this period especially illustrated the defects of the existing government organization for achieving anything like a balanced recognition of the diverse

considerations to be taken into account in formulating an adequate foreign food policy.

Although the reversal of policy with respect to food exports began in anticipation of VE-day and was intensified by the abrupt termination of lend-lease, this was greatly reinforced by events following VJ-day. In one of the most spectacular displays of lack of realistic foresight that occurred during the emergency cycle, the country embarked upon a policy of rapid liquidation of war-time activities and controls regardless of the consequences. A reconversion slump was to be averted if only the economy could be returned to private enterprise by eliminating wartime interventions rapidly enough. In this period such remnants of food controls as still existed were mostly removed or rendered ineffective.

Further illustrations of such limitations and lack of continuity in policy could be furnished by reviewing the termination of the United Nations Relief and Rehabilitation Administration, the experience with the succeeding Foreign Relief Program, and the evolution of Interim Aid. Gaps and inconsistencies also would be revealed by a comparison with other lines of policy development, such as those relating to international trade and United States participation in the various international organizations. It should not be necessary to go farther, however, to establish the point that important difficulties and limitations have been revealed, even though large accomplishments have sometimes been achieved as in the exportation of food.

In the evolution of foreign economic policy relating to food over the period since inauguration of lend-lease, the basic question of how far the United States should attempt to support levels of consumption abroad has persisted and at times has virtually submerged most other features. Some of the most important issues still before us also relate to this central question. Although these arise in our relations with other parts of the world, notably the Far East and to some extent Latin America, they are perhaps most clearly posed in the program of assistance to economic recovery in Western Europe and may be discussed in that connection.

Since enactment of the Foreign Assistance Act, it has been of first importance that the flow of food exports should be maintained at a high level. The situation in many of the importing countries was extremely critical when the legislation was enacted. Preceding provisions for aid—first through the United Nations Relief and

Rehabilitation Administration, then the Foreign Relief Program, and later Interim Aid—although substantial, had lacked continuity, were at times uncertain, and had provided no adequate reserves. The new legislation reflected a belated recognition of the extent of the national interest in European recovery and at the outset there was more danger that essential food shipments would be delayed or interrupted than there was of over-shipment. Hence, the newly established Economic Cooperation Administration had no real alternative to the prompt approval of requests insofar as they could be met—a policy phase which some members of the agency's staff characterize as "gap-filling." Under the circumstances, I do not see that this course should be criticized.

From a longer-run viewpoint, however, it should be recognized that the Foreign Assistance Act contemplates an investment of United States aid in "the establishment of sound economic conditions, stable international economic relationships, and the achievement by the countries of Europe of a healthy economy independent of extraordinary outside assistance." Insofar as the prospects for recovery are such as to reasonably assure capacity to repay, this investment is to be made in each participating country through the extension of credit. Beyond this, outright grants are to be made. But in either case the aid is to be an investment to enable each participating nation to regain a position of economic self-support and stability. The ECA has been given sweeping responsibilities for seeing that these investments are prudently made in the ways that will yield the largest possible returns in the form of recovery progress. It is clear that, if these responsibilities are to be fulfilled, the agency must very soon begin programming all forms of aid, including food, on the basis of an objective appraisal of the economic results obtainable in each instance.

I suppose we can all agree that under such planned programming large amounts of food would continue to be furnished. If they are to achieve a reasonable rate of progress towards recovery and stability, a number of countries will require food imports beyond what they could obtain without assistance. Available knowledge regarding both the economic situation in Europe and the importance of nutrition in the maintenance of productivity amply supports this view.

If the premise that United States assistance will not be continued indefinitely is accepted, then it follows that when the program is terminated the level of consumption that can be maintained by

any participating country will depend upon what its economy can support. This, of course, will be increased to the extent that recovery has been achieved. But the limits of progress attainable are determined by other things in addition to the availability of external aid during the period of reconstructiona and development. Such considerations as the resources available, organization of the internal economy, political stability, capacities and aspirations of the people also are important. Use of the limited resources available for foreign aid to establish levels of food consumption during the recovery period higher than can be supported when the aid program is terminated would: (1) Reduce the amount remaining for capital expansion, thereby limiting the extent of recovery and lowering the level of consumption that could be supported later, and (2) necessitate a downward adjustment of consumption to make the economy self-supporting when outside aid is discontinued. Each of these results would be contrary to the purposes of the program.

In view of these considerations, I conclude that food exports should continue to be important in this country's contribution to economic recovery abroad. In defining the goal of a self-supporting economy it is desirable to seek such improvement in levels of living, including diets, as is feasible. But in no instance should our foreign aid be directed towards establishing a level of food consumption within a receiving country higher than that country can support when the program is to be terminated.

I do not know what longer-term program standards are being formulated or will be finally adopted by ECA. But from observation and past experience it is not difficult to suggest influences that will tend to increase the amount of food aid above the level I have tried to define, and hence some of the issues involved.

For one thing, there is a very real possibility of over-estimating the level of consumption that can be supported on the basis of the reconstruction and development that can be achieved. Although consumption in the war-devastated countries has been low by any standards that might be applied, it has been kept high by comparison with production through large net imports. Only a cursory review is required to reveal the appalling size of the deficits created by these heavy import balances and, in the case of certain countries, by the decline in income from investments abroad and shipping or other services. There is a chance that it simply may not be possible to close this gap solely through recovery and development of agri-

culture and industry within the period of continued assistance. even if that period is extended well beyond any date contemplated in the legislation so far enacted. In such event the gap would have to be closed through the downward adjustment of consumption, including food consumption, for self-support to be achieved.

I have the impression that plans of the governments in devastated countries mostly do not contemplate the possibility of such downward adjustments. Instead they look towards increases above prewar levels, increases to be supported through extensive further development. Among the factors behind this appears to be a general shift in attitudes in the direction of accepting higher standards of consumption for the lower income groups, perhaps attributable in part to the experience with substantial redistribution of income and more equal sharing of scarce goods during the war. Whatever the cause, this trend may be desirable, so long as it does not go beyond what can be accomplished. But mistakes in evaluating the potentialities for recovery and development which resulted in the establishment of levels of consumption that could not be maintained beyond the period of external aid, might well result in the necessity for later adjustments that would have disastrous effects upon economic and political stability.

It is also quite possible that humanitarian and welfare considerations, accepted standards of nutritional adequacy, and short-run criteria relating to the prevention of social unrest and political instability, all will argue for United States assistance in supporting food consumption at levels higher than I have suggested. Considerations of need, equity, or fairness in the apportionment of assistance among nations so as to achieve greater equality in consumption may be especially important, since these tend to be presented forcefully and persuasively in the kind of negotiations involved in the co-operative programming of external aid. During the period of active aid, grants to countries lacking the ability to repay do effect a re-distribution of income. Moreover, the positions of the lowest income countries should be improved by the development which they achieve. Beyond this, however, as Professor Schultz emphasized in his paper, "Food, Agriculture, and Trade," presented before this association two years ago, "No rules, principles, and institutions have been developed, first to check and then to lessen the very wide gap as between different nations in income per head."

A further issue arises from the recurrently strong temptation to

attempt the purchase of immunity to the spread of communism by supporting the consumption of food in particular countries above the level for which I have argued. There appears to be little doubt but what this conception of foreign aid policy is a facter influencing support for the program by important groups in this country. History so recent as the past year has shown it may be effective in accomplishing short-run political aims. But if it is true that communism thrives upon economic demoralization, then yielding to this temptation to any large extent would seem to offer one of the most certain methods for defeating, in the longer run, the original purpose.

Probably the greatest threat to a constructive policy course that I see in the present situation arises out of the tendency to look upon the European Economic Cooperation Program, together with United States assistance to other areas, as a means of expanding the outlets for exports of agricultural commodities to benefit domestic farmers. I need not expand the point for this audience which should be more familiar than I am with the alertness of numerous agricultural pressure interests in exploiting opportunities to practice export dumping under a more defensible title. But if I have succeeded in making my point of view at all clear, you will underastnd why I am inclined to attach importance to the provisions relating to "surplus agricultural commodities" in the Foreign Assistance Act, as possible evidence of a grave weakness in the foreign food policies that we are evolving.

My choice of material and the organization of this discussion probably has revealed something of my concern over the maintenance of longer-run economic stability throughout the world. This reflects the importance which I attach to the problem of avoiding the kind of collapse that would bring mass unemployment and resulting widespread political unrest. In part also it indicates my feeling that there may be a significant gap in United States policy in the sense of a failure to face the problem of maintaining international economic stability. Because of these views, I am inclined to emphasize the danger that lack of foresight and lack of integration in United States policy could become a positive factor of instability.

Postwar economic instability has been a major danger in the view of most other countries. Those representatives of other governments with whom I have had contact have not appeared to be

greatly impressed by their observations of preparations to insure the maintenance of employment in the United States. Certainly the nations which participated in the successive trade conferences made abundantly clear their fears of becoming a part of a free-trading world economy in view of the dominant position occupied by this country and their lack of respect for its ability to maintain stability.

These fears have recently been less in evidence, in part perhaps because foreign representatives have looked upon United States grants and credit for recovery and development as providing ample support for domestic employment. But if this is not to be continued indefinitely, is there not a great danger of disastrous instability, especially if the economies of European countries adjust themselves to a position of dependence upon such assistance and then are forced to make drastic readjustments, when the aid is terminated?

In the commodity field, and especially in relation to food and agriculture, it seems to me the United States has consistently opposed consideration of international stabilization measures. In part this appears to have reflected the view that any such measures would be in conflict with a policy of free multi-lateral trade, although in part it may also have reflected a general domestic attitude towards decontrol. At any rate the United States has been unyielding in its refusal to consider stabilization undertakings—as, for example, in the FAO Preparatory Commission on World Food Proposals during the winter of 1946–47—excepting only the one device of international commodity agreements. Not only was this device offered as an alternative to all other proposals but it has been insisted upon as necessary to deal with the impending situation.

I shall not take the time to enlarge upon my personal skepticism regarding the possible effectiveness of commodity agreements. Suffice it to say that I question whether any individual commodity arrangements are likely to prove adequate for stabilization purposes, and that I also doubt whether agreements such as the proposed wheat agreement would actually work in practice. But those of you who disagree with me in this view should be able to recognize even more easily than I the important political issue that has been created by failure to ratify the wheat agreement. Having advanced commodity agreements as offering virtually a complete solution to the problem of international commodity stabilization, and having demanded detailed provision for such agreements in the charter

for the proposed International Trade Organization, the country has now failed to ratify the first important agreement negotiated. Certainly this places the government in a position of acute embarrassment in its dealings with other countries and hence may have repercussions upon the effectiveness of its leadership in the future.

DISCUSSION*

LEONARD K. ELMHIRST
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It is a privilege tonight to speak under the chairmanship of Jack Booth. His services to F.A.O. and to our Internation Conference of Agricultural Economists when it met at Macdonald College in 1938 have rightly established his reputation in the field of international statesmanship.

There are exciting aspects to Sir Herbert Broadley's paper which you will have noticed. He speaks and treats of the human family as one, as living in one house with one larder. That is still a revolutionary conception. In his description of the work of the different agencies he gives us with our very short memories an historical perspective which we badly need. As he measures for us the material requirements of the citizens of Europe, he challenges us to consider how best we can put economics and science at the service of humanity and of man as a consumer of material "goods."

In treating of policy, Dr. Rowe, however, reminds us that man is not only a consumer of material "goods" but a man of feelings, capable of quite contradictory kinds of reaction according as to whether he is stimulated by fear or by courage and hope. You will notice that he makes an appeal in his formulation of a foreign food policy in America for: statesmanship, leadership, imagination, courage, consistency and the long term view. He reminds us that the American public is capable of scepticism, indifference, isolationism, and near-panic and is always subject to pressure by special and not always unselfish interests. He tells us that administrators can be weak, can make promises they know they can't keep and can and do lose sight of sound principles and of long term needs in their search for day-to-day remedies.

He points out that stability in Europe can as easily be threatened by poor statesmanship as by unsound economics and that Europeans, as full of aspirations and of positive capacity as other men and women, need to feel confidence in themselves as well as in American policy. Can such confidence be instilled, he asks, by offering them limited material aid for strictly limited periods? Shots in the arm, he suggests, must not only be economically sound but the psychologically appropriate if they are to revive our self-respect in Europe.

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* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin September 13, 1948.

Within our own recent memory we have three examples, perhaps unique in all the history of the world, of international statesmanship which managed to combine sound economics with that psychological gesture that leapt right across traditional barriers of nationalism. So soon we forget or explain away gestures which at the moment they were made fired by their grandeur the imagination of men: The offer of lend-lease to Britain and her allied democracies, when struggling for their very existence, the offering of Marshall Aid at the lowest moment of our postwar hopelessness, and the challenge in 1940 on hardly any sound base of economic resource at all which Winston Churchill flung to responsible citizens in the fighting democracies everywhere.

In the middle thirties, Lord, then, Mr. Keynes returned to London from a visit to Washington and the White House. My wife put to him this question: Is economics today such an exact science as to enable an economist to advise a statesman with confidence in matters of public policy? "No," said Mr. Keynes. He then went on to explain that although man is a "goods" consuming creature, he is also a spiritual being and a social animal and that our capacity to measure his reaction under different circumstances is as yet inferior to our capacity to measure his material and physical needs. It is, he said, still the function of the statesman, while sensing the need and preference of his public and whilst using all the economic wisdom available, to build up confidence in his capacity to lead to the limit of their capacity to follow his guess. It is well then to recognise that our capacity to measure human reaction is still largely guesswork, that a people can show a negative reaction to fear, that, when inspired by an appropriate expression of trust and affection, they are capable of releasing astonishing bursts of energy and enthusiasm.

When released from fear and deeply inspired they are capable of an effort so incredible as to be comparable in the field of the physical sciences to the release of energy from the atom.

The challenge these two papers present then is to the economist to marshal all measurable facts in usable form for the service of the statesman and to the statesman, armed with all the services we economists can render, to make that psychological gesture as they term it in the theatre, that grips men's feelings and stirs their imagination and courage into action.

The day may come when the psychologists and the social anthropologists can also come to aid the statesman with measured data upon which his hunch or guess can be more solidly based than hitherto.

What the European nations need today is faith in themselves and in one another as well as in their family interest as human being regardless of national frontiers. They are not sure today how to develop this faith or whether America will stay with them long enough to prove her faith in their capacity. Inspired, we Europeans can be decent people, patient, tolerant, self-respecting, kindly, and courageous. Depressed by fear and bitter memories of our failures and shortcomings in the immediate past, we can be guilty of stupidity, intolerance, panic, persecution mania. We can even develope a craving for regimentation as a means of escape and demand some Pope or Papa or "ism" to rescue us from our childlike terrors.

All the financial devices, all the customs, unions, and trade treaties that economists can devise which fail to take these psychological factors into account will not by themselves get Europe over its next hurdle.

Dr. Rowe asks whether aid to Europe in limited amounts for strictly limited periods is likely to succeed. If the spiritual climate is right it may be sufficient, but the right challenge at the right moment in the right terms must also be available if the needed energy and drive is to be released.

The non-convertibility of sterling and dollar along with the rise in the inflationary spiral certainly plays a disintegrating role at the present time. The conscientious European is fast developing a feeling of guilt whenever he allows himself to covet American goods, tobacco, books, foodstuffs, or labour-saving machinery. He is being conditioned not to look in your direction at all for anything, when he should be much more discriminating and be saving such dollars as he can earn for those goods that will help him to stand once more on his own economic feet. He is also beginning to feel that he can never get around the corner and this hurts and undermines his self-respect. Too long or too great a pressure of this kind can have a devastating effect on his morale and on his capacity to respond to wise leadership. As I look out upon the concentrated economic wisdom gathered in front of me, I can't help but think that you should be able to use it to challenge us in positive ways and thereby arouse that hope and faith which will release unbounded energy and yield positive results in a spiritual as well as in a physical sense,

AGRICULTURAL STATISTICS

Chairman: Milton H. Button, Wisconsin State Department of Agriculture

STATE FRONTIERS IN AGRICULTURAL STATISTICS*

ARNOLD P. BENSON
Illinois Department of Agriculture

I AM conscious of the honor you do me in inviting me to participate in the program of the annual convention of the American Farm Economics Association. I sense too the responsibility that goes with such an honor, and I feel humble in speaking to you today on this subject. My views and my observations are based on a general interest in the subject of statistics, not unusual for one with a background of experience in newspaper publishing and editing, and my close association with our Agricultural Statistics office during the time I served as the Illinois Director of Agriculture.

A responsibility of State Departments of Agriculture in the United States is the basic field of agricultural statistics at the state level. For many state departments it is one of their larger responsibilities, and it has provided a growing opportunity. As our economy has become more complex and agriculture itself has become increasingly commercial, the need for more complete and timely statistics has become clear.

When agriculture was simpler and more self-sufficient it could get along with less information, but today with an agriculture depending mainly on the markets we have a much more sensitive situation. The opportunity to make and lose money on the farm is vastly greater now than it used to be. The demands of recent war years as well as the depression years taught us much about the growing range of needs in this field, and we now know that as our economy grows older the work in and use of agricultural data become more important. State departments of agriculture which have not already done so should recognize the expanding use and need of agricultural statistics and make provision for this work at the state and local levels. It is well known that State Departments of Agriculture vary

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* A paper read at the annual meeting of the American Farm Economics Association Green Lake, Wisconsin, September 13, 1948.

greatly from state to state and that the state efforts in agricultural statistics have varied likewise.

In Illinois some 75,000 pieces of mail go out to farmers, farm service organizations and the press in an average month. Mimeograph runs will approximate 140,000. Crop reporting accounts for most of this mailing, and our crop reports include all important types of agricultural production in our State.

The value of this work to Illinois farmers and to agencies that provide information to farmers is evidenced from the excerpts from a recent letter received by our Department from *Prairie Farmer*. I quote:

> "The more scientific and complex that agriculture becomes the more farmers and manufacturers serving the farm field are relying upon statistics for their work. We are finding an increased demand on the part of both our readers and the manufacturers, who regularly use these columns for advertising of their products, for up to the minute statistical information about agriculture in the State.
>
> "Probably the most valuable service that your division of Agricultural Statistics offers is the county analysis of the various classifications which it turns out. We have found that his service has no peer among the various services received in this office."

Today I will try to review some of the major aspects of agricultural statistics at the state level which I think should be emphasized. The title of my paper, "Senate Frontiers in Agricultural Statistics," sets up some definite boundaries for the things which we are to consider, which is always a good thing. It seems to me that we need to examine the following:

1. What are the most common problems and needs for agricultural data at the state and local levels?
2. If we can delineate the main needs and objectives, what ways are there of reaching them?

I shall try to limit myself to a few main issues which seem to be the major State frontiers in this work as I see them at this time, and they may be covered under the following heads:

1. A review of a survey recently made among state agricultural statisticians as to what they find is needed in the work for their states, and a listing of those items to which they would give priority if new resources were available to lay out additional work. I am indebted to Mr. Ebling to the Statistical Department of the State of Wisconsin and to Mr. Surratt from my own state for making available for my use the results of this survey.

2. What sort of program of service seems to work out in states where the work has developed farthest from the standpoint of meeting these state and local needs in agricultural statistics?
3. What are the opportunities for additional work in this field under the new Federal Research and Marketing Act, any longtime program of which must eventually rest to a considerable degree upon primary data on production and marketing in agriculture?

A Survey of What States Want

In order to get the views of informed individuals in different states as to what statistical data are most needed and which types of projects would be given priority if resources were available for extending the work, an inquiry was sent to state agricultural statisticians in June of this year. Twenty-four states[1] replied to this inquiry, and the replies received showed a great deal of agreement on certain major items that seem to be wanted in most states.

All of the states replying to the inquiry stressed the need for a greater development of county estimates and of programs to more fully meet the growing needs for local statistics. Generally these expressions were for more county and even township detail. To be sure, this need for sub-state breakdown of agricultural data does not take the same form in each state. In some states the need for local data is by irrigated and non-irrigated geographic areas; in others, local data are needed by uniform producing areas, but the striking thing is the widespread character of the demand for local data. In fact, this seems to be the most primary need in all states responding to the inquiry. From this it can be assumed that the problem is general and that at best in only a few states has it been adequately met up to now. Even in states where relatively good county data are available some extension of them would probably occur if more resources were available.

Another item for which practically all states expressed a desire was more analytical work and more interpretation and analysis of material already collected. It has long been recognized that more statistical material is collected than can be fully processed, but with the overload of work in state offices there seems to be a chronic problem in the lack of resources for analysis and interpretation of

[1] The following agricultural statisticians replied to the inquiry: A. E. Anderson, K. D. Blood, C. J. Borum, D. O. Boster, H. M. Brewer, A. C. Brittain, L. M. Carl, V. C. Childs, F. Daniels, O. M. Frost, E. L. Gasteiger, S. J. Gilbert, R. L. Gillett, C. J. Heltemes, M. M. Justin, G. Knutson, S. T. Marsh, F. Parker, E. C. Paxton, F. K. Reed, R. C. Ross, G. A. Scott, A. J. Surratt, and H. M. Taylor.

data from the standpoint of putting them more completely into use. Output of available material in published form or otherwise is one of the important functions in agricultural statistics which has been inadequately performed because of lack of resources and trained personnel.

Among the items of new information that were listed as being wanted in the states, the following stand out in the order of importance:

More county estimates
More Livestock disposition and marketing data,
Greater detail on market movement of crops
Extended coverage to minor crops
County farm income estimates
Feed crop balance estimates
Expanded price work
Fruit trees surveys
Irrigation and non-irrigation breakdowns

From the items listed it will be seen that the greatest emphasis is given to items dealing with county and local data. It is recognized, of course, that in some states a considerable amount of county material is now available on such things as crop acreages, crop yields, and estimates of production, as well as county inventory estimates on livestock numbers, etc. Even in states where this work is rather far along the demand seems to be for its further extension above everything else. As is to be expected, there is some geographic variation in the types of things that the states want most. In the Corn Belt, there is the emphasis on livestock data, in some of the Great Plains and Mountain States the emphasis is on both grain and livestock data, also dividing irrigated and non-irrigated crops with separate estimates for each by counties; and in some areas such things as fruit and vegetable crops receive very high priority because of the local importance of these items.

Another question asked in the survey concerned the priority which would be given in various items of work in the different states if funds were available for expanding the program. The states replying listed the following as the most important ones in the order given:

Annual state publication (commodity or county series, historical data, and current data).

Further development of county estimates of crop acreages, production, livestock numbers, etc.
County estimates of farm income. Improved State-Federal balance in relations.
Assessors' annual farm census.
Improved present coverage to fit individual state needs.
Marketing statistics—livestock and crops.
Develop better check data and market records.
Fruit tree age and variety surveys.

This list again emphasizes the extraordinary demand for material by counties. In practically all states, if the men had an opportunity to expand the work they would give this phase first priority. Because of the enormous growth of agricultural planning and other work and organizations at the county level, the demands for material at this level seem to be the most general and the most pressing of all. Again, one notes that there is some geographic variation in items farther down the list depending upon the things that are of first importance in the different areas, but there can be no doubt about the virtually unanimous agreement that first priority for new work lies with providing increasing amounts of local information, such as by counties.

What Can We Do About It?

It is one thing to show what is wanted, but how can we meet the situation? Perhaps by looking over the record we can get some of the answers from what has been done—both nationally and in those states where the work is farthest developed. The history of the work in agricultural statistics, especially during the last thirty years, is well known. For a long time it was mainly a function of the federal government centered in Washington. About the time that agricultural extension work was established through the Smith-Lever Act the work in agricultural statistics was partly decentralized by the establishment of state offices. This movement was in line with the trend of the times—a movement of agricultural functions from the national levels to state and local or county levels.

Beginning in Wisconsin in 1917, cooperative work was established between the United States Department of Agriculture and most of the states. While a number of states were independently doing some work in agricultural statistics prior to this time, many more have developed it under the cooperative arrangement with

the federal government. This had many advantages, one of the major ones being the degree of standardization of the work which was possible among the states because of the help of the federal agencies and of the standardized needs of the United States Department of Agriculture for the data it required at the national level. It resulted in the well-known methods of handling data on crops, including acreage, yield, price, etc., and similarly data for livestock.

On major items a good deal of standardization has been developed for all states because of the emphasis of needs at the national level and because the professional personnel employed has been mainly on federal civil service. Professionally, this has done much for the service, and what standardization we have by states we owe largely to this development. Some states already have come a long way in building up a good standard of service and wide coverage. Even so, much more coordination and standardization of the work among the states is needed.

The difficulties which one faces when he tries to get and compare factual material in the different states or for subdivisions of states must be well known to the members of the Farm Economic Association. In some states data are quite easily available and in good order, while in others much that is wanted is only partially available or not available at all. Even in such things as state farm price indexes, where available, there are often questions of comparability of one state with another. From the standpoint of greater utility I hope that similar material similarly prepared will be available before many more years in the reports issued by states, also that all agricultural leaders and organizations will cooperate to this end. A word of commendation is certainly due the Division of Agricultural Estimates of the Bureau of Agricultural Economics for the generally excellent influence which has already been exercised along this line.

We Need More Balanced Levels of Service

Quite logically the early work in agricultural statistics was largely a task of providing data at the national level. Getting data by states has often been merely a means of providing a basis for good national totals. The census, for example, has for a century collected data which could be summarized by townships, by counties, by states, and nationally. National totals appeared as a first

objective and the state totals which accumulate to national totals as a second objective. Needs at the national level are quite well met, and on many items they are likewise well taken care of at the state level. However, when it comes to data by subdivisions of states, particularly counties, the development between states varies greatly and in general the needs of this entire level are still unsatisfied. Yet one of the major needs for the standpoint of state work is found here.

It is true, of course, that various data are published for the census years by counties, and also there have been some attempts to publish certain items by townships. Nevertheless, it is clear that while for a hundred years we have collected data in detail in the smaller subdivisions for transmission to distant places, only a small part of the local data was returned to the areas of origin for local use. To bring about adequate publication of available material in the subdivisions of states, and to integrate this material both over time and in terms of local geography, economy and history, I am sure, offers one of the challenges of our time.

The very nature of the problem suggests that it will have to be worked out largely in the states and it is gratifying to know that some good headway has been made on the job. It is also of interest to known that the Chief of the Bureau of Agricultural Economics is working with the officials in the Extension Service for the purpose of finding a way of achieving this task nationally. It requires a balanced program with adequate resources for each of the three levels of service—national—state—and local.

In some states the balance between the three levels of functioning and responsibility is much better than in others, but generally the local and state work is underdeveloped as compared with that at the national level. There is no doubt but that the states must assume the principal responsibility for developing the levels within their borders, but at the same time, one may well ask the question, "Is the U.S.D.A. pushing the matter enough to get the needed things done?" Alter all, good results at the national level must finally depend on the work in the levels below and the better these are developed the better should be the national position in this service.

The importance of breaking down our material by counties and often by townships becomes apparent when we note the increasing scope of activities of agriculture now being conducted in the

counties. The great growth of Extension work at the county level, educational work in the counties, government functions, farm and industry organizations, etc., point out the need. Extension work in the counties has long been organized on a project basis separately for each county.[2] As one Extension man put it, "It is difficult to run such county programs without factual material on the counties."

The types of data needed locally, usually are different from those needed at other levels. At the national level and often at the state level the matter of time series data measuring the current changes from month to month or from year to year are of greatest interest. But when we come to the local level, the emphasis changes. Here we have a greater need for data that show the geographic patterns within the county than for the latest figure showing the current changes over time. Changing patterns in the teaching of agriculture now also require local data before those for larger units such as the state or the country as a whole.[3] Then too the demand for county agricultural statistics from industrial, transportation and financial agencies dealing directly or indirectly with farmers equals that from the agricultural industry.

There are over 3,000 agricultural counties in the United States. The state level task of dealing with so many units must have the financial support and backing of the state. It requires specialized knowledge of each unit as well as a capacity to prepare and organize data by counties into a logical sequence so that a story of each county will be known in terms of geography, local economics and history. Along with the primary problems of preparation of such material is that of keeping it up to date, which becomes an important and continuous project. It is encouraging to note that the need and value of this county service have been recognized and are gaining support in an increasing number of states.

Specialized Personnel Needed in State Work

It must be recognized that because of their varied geography and variation in agricultural production, not all states and subdivisions of states can be treated alike. The highly important

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[2] For a full discussion of agricultural data needs in extension work, see a paper by C. D. Caparoon and E. A. Jorgensen, this JOURNAL, XXX, page 282.

[3] For a discussion of this see "The Use of Agricultural Statistics in Schools" by Walter H. Ebling and Louis M. Sasman, this JOURNAL, XXX, Page 292.

standardization which has been possible because of cooperative arrangement between the state and the federal government has many advantages at both the state and national levels. Because the states differ greatly, a knowledge of a state's economy, its geography, and its history is quite basic to rendering those specific services within the state. Professional personnel in the field up to now has been mainly federal, and this has had real value in developing fairly uniform state level data for most states; but with the increasing decentralization of work and the greater recognition of needs within the states, we have reached a time when there is urgent need for more understanding of the internal characteristics of the states themselves.

In order to make the most of the opportunities which lie here the workers need to be well grounded in their knowledge about the state. The local variations in states present so great a challenge that to provide the needed data and their interpretations this kind of knowledge and understanding is necessary. To function properly, this local work must have resources for the job. There must be sufficient autonomy in the program so that it can be carried out independently, and there must be continuity of service.

It may be one thing to know the work as a national operation and perhaps quite another to know it as a function internally within a state. The broad knowledge of the state's agriculture as it is related to its entire economy, its geography, and its history comes only with time and experience. To some degree it can be met by college training, but most of it has to be learned on the job. For the purpose of broadening experience and promoting proficiency it has been the custom to move personnel from one state to another or to the Washington office with the result that much of the training in dealing with the local situations has been lost. Such personnel should be moved less frequently and moves should not be made without proper provision for the continuation of the work through the proper training of others. A balancing of staffs with at least a part of the personnel specializing in detailed internal knowledge of each state would seem to be one of the first essentials in making possible an adequate state program.

R & MA Opportunities in Statistics

From the standpoint of further developing and rounding out the agricultural statistics work in the states, the Research and

Marketing Act of 1946 is of the greatest importance. This Act establishes a long-time program of research in marketing of agricultural products. Already the State of Illinois has entered an agreement for work in this field, and our share of the cost of this work for this biennium is $25,000.00. Any long-time program of this type must contemplate basic work in marketing statistics rather similar to the production statistics which are already quite well developed at least on a national and state basis. State departments of agriculture through their statistical offices have an opportunity to make an important contribution by combining the development of new data on marketing of farm products with the data already being brought together mainly on agricultural production. In fact some of the unfinished functions in the old field of work can readily fall within the scope of the new Act.

The rounding out of our service to agriculture so as to include new material on marketing will probably confront us all in the next few years. Because of this each state should give serious consideration to developing some broad projects under the new Act with the objective of providing the needed marketing data on crops, livestock, dairying, poultry and eggs. Programs will need to vary for the different states because of the relative importance of the different commodities. Certain types of marketing data should, if possible, run through the structure so that they will be available within reason for all parts of the country in which the commodities involved are important. The work under the Research and Marketing Act has to begin with projects set up in the states. However, it should look forward to a coordinated program of work rather than an unrelated aggregation of projects. The work on marketing data if properly associated with the existing activities in agricultural statistics in which we already have a considerable standardization, should coordinate more readily than most of the other phases of marketing work developed under the Act. It would seem that state departments of agriculture have here an unusual opportunity to develop a broad field of work in marketing data paralleling what has already been built in production data.

The administrators of the Marketing Act can well afford to invest a part of their funds in primary data on which the bulk of their projects must rest. In fact, it is hard to conceive of a long-run marketing program without such material as a firm and continued foundation. Those of us interested in agricultural statistics in the

states should welcome the opportunities presented under this new law. We should without delay establish broad basic lines of work and we should ask the federal agency to attempt some coordination of it among the states so that instead of a great array of projects we come early to a broad basic program of marketing data. We have in most of the state statistical offices enough experience and talent so that we can move boldly in that direction. The ends may be achieved by somewhat different means and even through different agencies in the various states, but the objective of data on the marketing of agricultural products at the farm as a part of this field should be staked out early and vigorously pursued. Already there are enough projects underway in states so that the framework can be discerned, and I would like to urge state commissioners of agriculture and the Bureau of Agricultural Economics to undertake a program of cooperative work in the development of the marketing data which will be needed under the RMA programs in marketing if these are to grow into the usefulness Congress has a right to expect.

To summarize, then it is my thought that the States should take the major share of responsibility in the field of agricultural statistics dealing with the preparation and publication of county agricultural statistics or sub-State breakdowns and entirely for assessors' farm census work. The practical value and expanding uses of these data within states are well known to this group.

I am indebted to the State statisticians in twenty-four states who cooperated in the recent survey which points out the outstanding needs for strengthening and extending the State and National service in agricultural statistics. It is clear from the results of this survey that county agricultural statistics and sub-State breakdowns are given top priority. It also stresses the importance of annual State publications and the need of extending other services to better equip State offices for meeting the expanding uses and calls for agricultural statistics. The preparation and publication of county and sub-State data vastly increases the amount of detail and time taking work. Our service possesses the "know-how " for expanded lines of work but our State offices, by and large, are understaffed.

Research and marketing programs initiated in the states but integrated nationally, offier an exceptional opportunity for expansion to the point where local and national needs for basic data

better can be met. State resources provided for this purpose should be used mainly for state work.

The importance of local data should not be underrated at the National level. If observed this will strengthen the entire structure from the local to the State and National levels. In some states I feel that more attention should be directed to working our a more balanced program at these three levels. This will require skilled leadership. I feel that the U.S.D.A. is well equipped to share in the aggressive action needed to obtain improvement in standardization and service.

If I may conclude with a recommendation it will be that both the States and the U.S.D.A. make added provision for employing and training specialized personnel for this cooperative work. Also to maintain a balance so that the number of more experienced men are ample to carry out State programs without a break in the flow or efficiency of the schedule of service. The maintenance of a well informed and balanced State staff is certainly one of the first essentials to an adequate State program. Also I would recommend that both the state and National Departments of Agriculture canvass more vigorously R.M.A. possibilities for broadening and improving our fields of public service, particularly the needed service emphasized in the returns from the state survey, and also to provide the marketing data which will be essential to the long-run success of the R.M.A. Act.

DISCUSSION*

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Being a statistician it is natural for me to start by giving a few figures as a background to later discussion. The Bureau has 41 State statistical offices which serve all of the 48 States. In 40 of them formal cooperative agreements are maintained with State Departments of Agriculture or State Colleges of Agriculture, or both, for the collection and publication of agricultural statistics. In 7 States the cooperation is limited to statistics on manufactured dairy products. Of the remaining 33 States, the Bureau cooperates with the State Departments of Agriculture in 28 and with the State Colleges in 7. With the programs developing under the Research and Marketing Act, agricultural agencies in a number of additional States have become interested in strengthening the statistical work at the local level

* A discussion given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 13, 1948.

as an aid to marketing programs. It now appears that such agreements will be completed in at least 3 additional States within the next few months.

In total, the States put about $470,000 into these cooperative offices last year—the amount ranging from less than $1000 in some States to $85,000 in California. Other States making important contributions to the agricultural statistics program are Wisconsin, Illinois, North Carolina and New York. As Mr. Benson has stated, this cooperative work started back in 1917. The purpose of these cooperative agreements between State and Federal agencies was to eliminate duplication in the collection and publication of agricultural statistics at the State level; to provide a coordinated program of State and national agricultural statistics; and to make it possible to provide better local information such as county estimates. Over the years this cooperation has been highly effective and at the present time there is practically no duplication between State and Federal agencies in the collection and publication of agricultural production statistics. This program has also resulted in the desirable standardization of statistical work mentioned by Mr. Benson. It is providing much more information at the local and State level than would be possible with each agency carrying on a program alone. In the States where agreements are in effect I believe also that they have resulted in a stronger State statistical program as well as adding greatly to the national program. After all, many of our national statistics on agriculture are built up on an individual State basis and a strong State program means greater strength at the national level.

These cooperative arrangements have always recognized the State responsibility for information at the sub-State or local level. For the most part, it will have to remain a State responsibility and the volume of local data made available will largely depend upon the amount of support which the individual States can provide. Some further standardization in agricultural statistics for sub-State areas may be possible. This can probably be best accomplished, as it has in the past, with the Washington office acting as a coordinating unit providing for the interchange of ideas, results of research carried on in the various States, and new methods developed, as well as general technical and counseling help. However, local needs vary by States and even within States. Thus state needs are an important factor in determining what each State shall do for the money it puts into the collection of agricultural data. To meet the needs expressed generally throughout the country the Federal Bureau is anxious to give all the assistance it can in the development of local data, provided that States want such help.

Strengthening of the Field Offices

The Bureau has long recognized the need for strengthening the State statistician offices not only to do a better job on the agricultural statistics now being provided but in meeting additional or new needs. Even with some increases in appropriations for the statistical work of the Bureau these increases have not kept pace with increase in costs and usually such increases have carried with them commitments to carry out new lines of work. We find it difficult to drop lines of work because the interests which

were instrumental in providing for a line of statistical work insist that it be continued.

In a recent survey among our State statisticians on the needs for strengthening the offices, each office was asked to list the kinds of data now collected which needed to be improved or expanded. Thirty-seven of the 41 offices listed as first priority the need for improving or expanding the entire program of county statistics. These replies emphasize the point that Director Benson has made regarding the need for county and sub-State data. A wide range in the types of county and sub-State data seems to be wanted in the different states. While the Federal Government has provided funds since 1933 for preparation of basic ounty statistics on acreage, yield and production of such crops as wheat, cotton, corn in commercial corn areas, rice, flax, etc., which were needed in the administration of adjustment and crop insurance programs, the development of most county statistics rests with the States. The State men reported a wide range in the types of county statistics requested.

While the program of county estimates was given top priority by the State Agricultural Statisticians in the kinds of data now collected which need to be improved or expanded, there were also other types of information wanted and I am sure this group would be interested in a list of them. The following are the more important ones in the order of frequency of mention:

Prices received and paid
Livestock numbers and production
Marketing data on crops and livestock
Truck crops for fresh use and processing, including market gardens
Release and publication of data already collected
Expanded information on fruits and berries including number of trees, production and utilization and value by varieties and age groups.
Expanded poultry program including broilers, eggs, turkeys, etc.
Utilization of farm products
Production, utilization and value of dairy products

It will be noted that most of the important statistical series now being issued were mentioned as needing improvement in at least some States. The fact that release and publication of data already collected was mentioned frequently emphasizes the importance of sufficient resources to interpret, analyze and publish more of the statistical material already collected. Generally these needs can only be met by securing additional resources.

Specialized Personnel

This leads me to the matter of personnel. Director Benson has mentioned the need under an expanded program providing longer tenure of experienced technical help in the individual State office. The Federal agency recognizes the value of experience and knowledge of agriculture in a particular State when working on problems dealing with that particular State. Under a growing Federal program with much of the technical personnel under Federal Civil Service it has been necessary to move such personnel in accordance with requirements of the over-all program. This has been

one of the factors leading to standardization and has given each individual a chance to gain experience and advance more rapidly than would otherwise have been possible. It has also given them a fuller appreciation of the national program.

Opportunities under the Research and Marketing Act

It seems that the Research and Marketing Act of 1946 offers opportunities for expanding the agricultural statistics—not only at the State level but also at the local level. Practically every marketing program which is set up requires basic agricultural information either on production, supply, market outlets or some other category which is of importance in solving marketing problems. A number of States have already taken advantage of such funds in expanding their program in agricultural statistics by developing marketing data. Such cooperative RMA projects are in operation approved in 9 States. These cover such projects as:

Collections, tabulation and dissemination of statistics relating to fruits and vegetables on less than State basis.
Estimates of number of sows farrowed monthly.
Developing methods for forecasting monthly marketings of hogs.
Number of fruit trees by varieties and age groups.
Developing series of monthly and season prices for principal apple varieties.
Development of more complete statistics on poultry at the State and local level.
Development of primary statistics in milk production, utilization and marketing at the farm by local market areas.
Study of basic trends in commercial production and marketings of fruits and vegetables and processing crops by areas.
Sources, markets and marketing outlets of livestock by counties and market areas.
Survey of grain storage capacity survey on and off farms.
Development of statistics on prices received by farmers for agricultural products, particularly wheat, beef cattle and eggs by classes or grades and by local areas.
Survey of capacity of alfalfa dehydrating plants.

As mentioned earlier the availability of RMA funds is expected to lead to cooperative agreements on agricultural statistics between the Bureau and State Agencies in at least three additional States. Those charged with the responsibility of administering RMA funds are interested in expanding the work with the State Departments of Agriculture into additional States and this offers many opportunities. Here again the matter of standardization is rather difficult because of varying demands among various States. The Bureau is glad to give what assistance it can in developing the statistical program under the RMA Act, and is particularly interested in seeing that certain broad objectives are carried out in State projects and the type of projects undertaken. The Bureau has also assisted in setting up and developing methods for carrying out some State projects undertaken with RMA funds. However, funds which are allocated to the State Departments of Agriculture for matching under the Research Marketing Act become essentially State funds and the primary responsibility for their expenditure rests with the State agency, and the State statistician in charge of the joint office represents the State in carrying out RMA projects assigned to him.

The Bureau in its requests for RMA funds at the national level for the collection of statistical data needed in marketing research has followed the policy of recommending projects which round out programs of a national character such as data on stocks of flaxseed and sorghum grains, naval stores and broiler supplies in commercial areas as well as recommending programs in new fields where research is necessary to determine the most effective means of collecting needed information.

The importance of the RMA Act in developing marketing data to parallel production data is recognized. Undoubtedly some coordination may be needed in Washington and much more will be needed in the States. In the States it is evident that much public relations work lies ahead to develop concentrated interest in some subjects. At the present time our field offices vary considerably in their capacity to develop and coordinate these various group interests, and the available experience in such offices needs to be exchanged. I would also like to emphasize the necessity and desirability of any agency planning a research project to carefully review the field of available basic data on the subject; if the needed statistical information is not available, provision should be made in the project to collect it. In the past year some RMA projects were started without full knowledge of the limitations in the basic statistics available on the subject. Consequently there have developed urgent requests for statistical information which cannot be met with existing resources. It is also just as important that existing data are not duplicated.

In closing I want to suggest that the Bureau through its State offices and with its coordinating technical group in Washington is in a position to render assistance in developing methods for collecting additional agricultural data and in the compilation and publication of such data. In other words, the technical skill and the "know-how" is generally available if the necessary resources can be provided.

PRESENTATION OF AGRICULTURAL DATA IN THE STATES*

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Bureau of Agricultural Economics

AN OLD-TIME statistician was once heard to remark that in his work he provided certain figures and then he was through. Specifically he said, "I give 'em the figgers and then I'm done." In agriculture a truer statement of the situation is "We provide the basic figures and then we are about half done." What we mean to say is that our job breaks roughly into two halves, (1)—the collection, analysis and processing of data and (2)—the proper organization and presentation of the results so as to make the material available widely in understandable form. These two aspects of the job have been referred to as the "input and output phases of the work."[1]

Too long statisticians have felt like the old-timer and considered their job done after they have collected certain data and from their efforts developed certain end product figures and offered them to those interested, perhaps in some established form. Or in cases the data have been filed away for reference so that in case anyone raised the right question it could be answered by referring to the material.

The job in agriculture now requires much more than that. The industry is now so complex and functions so minutely at different levels that statistical material either measuring the agricultural universe or current changes therein provides a constant and costly flow of facts. If we are to serve today's needs these must be made reasonably available at all levels. Only when we achieve this can our data have a maximum usefulness in the innumerable decisions which nearly everyone must make. Theodore Roosevelt is credited with the remark that nine-tenths of wisdom is to be wise in time.

The earliest attempts at presenting agricultural data in the United States were confined mainly to a national level. Of course, the people were then living largely east of the Mississippi and even

* Paper read at the annual meeting of the American Farm Economic Association Green Lake, Wisconsin, September 13, 1948.

[1] See paper entitled "State Opportunities in Agricultural Statistics" by Walter H. Ebling, read at annual meeting of the National Association of Commissioners, Secretaries and Directors of Agriculture, Memphis, Tennessee, November 13, 1945, mimeographed.

there there were large sections in which there were few people. Nor were there means by which material could be easily transmitted to the people; hence there was not much incentive to go below the national level. Some material—notably the census reports—did contain state data, but then, even as now, there were few places in the states where census reports could be found.

Progress after 1920

Great strides were made in the presentation of agricultural data at all levels during the period between the first World War and the second. State departments of agriculture and research organizations began to more effectively present available materials. Current reports on some phases of agriculture which had been featured almost solely by the Federal government gradually became rather common at state levels. Then the federal and state governments cooperated to establish the Crop and Livestock Reporting Service the advantages of county data began to be stressed but the presentation of those data was sporadic and not at all uniform from state to state.

Bulletins dealing with the broader aspects of agriculture as well as those treating with minute technical details did become available. Varied in quality as some of these efforts were, they indicated a growing consciousness that people were interested in accurate and reliable information below the national level. The greatest progress was made during the later part of the inter-war period. Minor civil division statistics appeared in some states. Almost every index or bibliography shows that the decade preceding 1940 was prolific as far as agricultural publications were concerned.

During the recent war certain types of agricultural data were emphasized. Production and price statistics particularly were items of interest not only to people engaged in farming or the processing of agricultural products but to consumers as well. Current news stories on these items made the front pages. This aroused or renewed interest in agricultural data has not abated since the war. Probably there never was a period when people were more willing and eager to use figures than now, and the demand for basic information has increased especially for local area detail. The satisfaction of one need has merely stimulated another. Schools, county agents, agricultural leaders, industries, and others are now looking for more and better local area data. In so far as resources permit

these needs and demands should be satisfied by new or revised data and through whatever outlets are available.

Presentation

Usually when the word "presentation" is used in connection with statistical data, people think of charts, maps, and cartograms of various types. Important though graphic representation is in effectively presenting agricultural data, it is not the only method. For some purposes textual and tabular presentations are equally effective. In fact, under certain circumstances such material may even be better than charts. Of course, a combination of all three is usually considered best—a table for the detail, a chart to emphasize the outstanding features of the table, and a text to explain both the table and the chart.

Textual

Of the three methods of presenting data, the written copy is in some ways the most difficult to prepare and undoubtedly is the method which receives the most justifiable criticism. Textual material whether for a speech, a radio talk, a current news release, or for a bulletin, can be a highly effective means of presentation. The main trouble is that too often the material is not well prepared. On the whole, most written material intended for consumption at a local level reaches people with a great variety of backgrounds. interests, and education. This means that whatever is written for general use must be simple, free of technical terms, and as free as possible from the many qualifications which commonly hedge the written statement of technicians and professional workers.

Much of the trouble with textual materials results from the lack of training on the part of those who do the writing. A good technician does not necessarily make a good writer—in fact the reverse is too often true. As in the case of statisticians or scientists, good writers usually have special training. This especially is true today when there are so many channels through which information can be disseminated. Each channel requires some special handling. The copy for a speech must be handled differently from that which is prepared for a radio talk while bulletin copy differs greatly from the two already mentioned or from a press release. Journalistic techniques are necessary when preparing data for general consumption. Few technical and professional men have had the training or

experience in the type of writing which is most effective for the average reader.

Equally important in the failure of manuscripts is the refusal of some technicians to compromise with the writer. Even though the technician and the writer may be the same person there is still a reluctance to avoid technical terminology. Regardless of the ultimate reader the statistician too often insists upon technical words and phrases which while clear to professional associates may not be so to the general readers. Broad general conclusions are too often sacrificed to detail. This is especially serious when attempting to present data to the average reader—person whose reading consists of an hour in the evening with the daily newspaper and a popular magazine or two. These people can be reached, but it takes a skillfully prepared factual story written in a simple, straightforward manner, and putting first things first.

Tabular Preparation

Tabular presentations of data are by themselves mainly useful to a very limited number of people. When accompanied by explanatory text or by illustrative charts or by both they reach a wider audience. Most common, of course, is the table-text combination. Although normally using few tables, newspapers frequently use the table-chart combination very effectively with little or no text. At the local level such combinations are most helpful. The ordinary reader is not interested in straight tables. He wants to know "what does it all mean?" It becomes the job of the statistician to provide general summary statements interpreting the tabular materials, and to make tables so simple that the average reader can refer from text to table and approvingly say "yes, there it is."

However, under certain conditions tables can be effectively used without text or chart. Probably the most effective use of straight tabular presentation is in answer to requests for data. Sometimes tables need to be accompanied by explanatory letters but often they alone will suffice. Requests for data which can be answered by sending a table already prepared are generally from people who are familiar with the material and who need only the specific detail contained in the table, possibly to bring previous material up to date. To have already prepared mimeographed or printed tables which can be sent in answer to requests is a tremendous advantage. There is no question about the time saved. Local area detail can

be prepared once and after being duplicated can be used for countless requests much of it over several years. Uniformity can be maintained from year to year. A collection of local area tables for a period can easily form the basis for small publications. Not to be ignored is the effect upon the person who needs the data. It is received more quickly and is packaged more conveniently.

Tables intended for the general public must be simple. Few people who work continuously with statistical data realize how imposing an array of figures can be to the person who sees the material for the first time. This cannot be emphasized too strongly when attempting to present statistical data in tabular form at the local level.

Tables need to be carefully planned. A poorly constructed table is as misleading as a poorly constructed sentence. The requisites of good tables are well known. In most general textbooks on statistical methods some space is given to proper methods of table construction. Yet not all tables are well constructed. Some of this is the result of carelessness arising from long familiarity with tabular material. For example, every table should be properly indentified. Yet it is surprising how many pages containing tables could be clipped from bulletins and there would be no clue as to the publication from which they were taken or the agency responsible.

Graphic Presentation

It is the field of graphics which offers most to the presentation of agricultural data. Agricultural statistics as a whole are ideally adapted to the most illustrative types of graphs, cartograms, and the pictograms. The chart presents at a glance certain important facts and relationships existing within statistical data. One author has expressed it well—"A picture may instantly present what a book could set forth only in a hundred pages."[2]

Pictures, maps, and charts all rank high as methods or aids in teaching both adults and children. The majority of people learn best through visual images or the construction of mental images based upon experience. Long columns of figures are not conducive to the construction of mental images. Neither is textual material liberally sprinkled with figures. Few people have the ability to look at even the neatest tabulations and to get quickly the most

[2] Ivan S. Turgenico.

significant features. Relative values and relative amounts are hard to visualize and the mental images resulting from examining a table or reading a text are not always clearly defined. It is because of the inability of people to establish clear-cut visual images that they say statistics are dull and uninteresting. However, this difficulty is not only characteristic of the average reader. Even technical and professional people find statistics monotonous because they are unable to visualize the data easily, or the strain of creating mental images is a tedious process. Because the chart does these things it often is the logical method of presentation.

That the chart is often the logical method of presenting statistical material should not be construed to mean that charts, graphs, and maps should replace textual and tabular presentations. Far from it. A chart cannot be used in a radio talk no matter how illustrative it might be. Some statistical data have characteristics which cannot be charted simply and truthfully. In those cases the table is more effective. The statement, "the transformation of a good table to a bad graph is not a statistical achievement,"[3] is well worth remembering. Some of the relationships in data are so complicated they should not be charted. While it is true that complex relationships in data often appear less complicated when charted, a complex relationship usually requires a complex chart. The complex chart seldom is an improvement over the table and it violates the primary purpose of graphic presentation—namely, that the facts and relationships in data be seen correctly at a glance.

However, the chart should not be considered only as a method of displaying tabular material. Each chart has functions of its own. Emphasis upon certain phases of data gives added significance to certain facts and relationships. This same emphasis directs the attention of the reader into certain specific channels. Graphs may illustrate facts which cannot be easily discussed or clearly explained even in texts. The chart is designed to attract the attention of the casual and possibly uninterested reader. These are the factors which make graphic presentation so effective at the local level. By attracting the attention of the casual reader and directing attention to certain features, the illustrative diagram becomes a powerful influence. Certain obligations are incurred, therefore, which, while

[3] E. A. Goldenweiser, *Classification and Limitations of Statistical Graphics.* Publications of the American Statistical Association. Vol. 15 (1916–17), pp. 205–209.

they also apply to other forms of presentation, must be most carefully considered in graphic methods.

The first obligation is truthfulness. The chart goes out of its way to attract the uninterested and the uninformed. The expectation is that emphasis and direction will give the reader certain facts and impressions. Nothing in the chart tells him what conclusions to avoid. Usually the reader at whom the chart is aimed is not trained in statistical methods or techniques. He has trouble with mental impressions of relative values and amounts, but he likes pictures and learns best through simple visual images. For those reasons the impressions received from a chart are real and vivid to him. Being unable to distinguish errors in a chart, wrong ideas when impressed on his mind are difficult to correct.

Deception in charts is mostly unintentional. It arises from three sources: (1) misinterpretation of the primary facts within the data; (2) mistakes in the selection of chart types; or (3) errors in chart construction. The emphasis that graphs provide frequently exposes errors in analysis and interpretation. If the same person prepares the chart as does the interpretive work, these errors are most likely to be detected. When chart and text are prepared independently and assembled at the last minute such errors may remain undetected. Mistakes in the selection of charts to portray data arise primarily from a lack of knowledge of the many chart types and the advantages and disadvantages of each.

The second of the obligations is simplicity. Simple ideas and simple comparisons are most easily understood and remembered. To the average reader a complex chart is something to be avoided, not because he may not understand it, but because it requires time for study. If for no other reason, the complex chart should be avoided because of the danger of misinterpretation. If the objectives of the chart cannot be clearly understood or are only partly understood—one being fully as bad as the other—the chart is poor.

Clarity is the third essential. A chart may be simple as far as type is concerned, but not always clear. Two series may be plotted on a simple line graph, but the implied relationship between the two may be difficult to ascertain. Area representations have been severely criticized—and still are today in many quarters—because it is felt that the area comparison is not easily understood or measured. It is just as essential that the meaning of a chart be clear as it is that there are not mistakes in its construction.

The final essential is appeal. Unless a chart is read it is of little value. Charts are read because people have an interest in the subject or because some feature of the presentation has caught the eye. Undoubtedly, appeal is more of a factor than either simplicity or truthfulness. Some charts have much more appeal than others. Also a chart may be simple, truthful, and clear, yet have little appeal because it is poorly lettered, badly titled, or placed in a poor position on the page. One author states it bluntly "A diagram which is well designed but poorly executed will receive little attention while one which violates elementary rules but is striking and attractive receives unmerited consideration."[4]

The greatly increased use of graphic methods for presenting data which has come about has tended to simplify the problems of presentation. People are now familiar with nearly all types of graphs and charts and no longer require long and elaborate explanatory texts. Yet the very effectiveness of graphic representation has brought its problems. People are demanding more and more in the way of charts and diagrams, and there is a limit to which these can be substituted for the study of the data themselves.

To the average statistician the presentation of agricultural data by graphic methods presents some difficulties. Usually the feeling is that with the lack of equipment and trained personnel the competition is too keen. At the national level competition is keen. Authors of books use the services of commercial artists while magazines and publishers have personnel trained in every phase of presentation. However, at the local level the competition is less keen and there lies one of the great opportunities for graphic devices in agricultural statistics. Technical literature and scientific journals seldom reach the farm. Local area farm magazines and newspapers are usually no better equipped that the average statistician.

In developing such work in states the most serious lack is that of trained personnel. Suprisingly little equipment is necessary for the simple charts. Lettering guides come in many styles and require only practice for proficiency. Commercial companies can supply more varieties of shaded patterns than the average draftsman can draw. One common weakness is the lack of knowledge of chart types, their advantages and disadvantages, and the lack of understanding of the data. What is really needed is someone

[4] Robert A. Reigel, *Elements of Business Statistics*, p 42.

trained in statistical methods and graphic methods with ability to execute graphic representations and also with some training in journalism.

The lack of trained personnel could be remedied. It seldom can be accomplished through employment sources since the combination of statistical and graphic training is not too common, and the combination of these with training in journalism is almost never found. Trained personnel could be acquired by two methods: (1) training at a central agency, and (2) training on the job. Training by the central agency whould have some advantages since the trainee could study intensively under specialists in graphic representation and journalism. The disadvantage of the length of time required away from the local area office could be overcome by training on the job. One expert, or perhaps two or three, could be assigned to an office to help prepare a publication for local area use. They could train one or more persons in all of the aspects of data presentation. Such a team should include (1) a journalist to demonstrate not only writing but the problems of layout and page makeup; (2) a statistical draftsman for demonstrating graphic techniques; (3) a skilled clerk to demonstrate data collection in rough form, proper checking of tables and copy, and indexing. Such a team not only would provide training but would also render service by preparing bulletins in the various offices and laying the groundwork for future publications.

Data and Presentation

The agricultural statistician handles many types of data. It is no wonder that questions such as "What can be done with these data" or "how should this be best presented?" are often puzzling. Probably the most important factor which must be considered is the type of data. Agricultural data may be divided into four major groups. Each group has certain characteristics which become important in determining the presentation of those data. These characteristics are doubly important in determining the types of charts to be used in graphic presentations. The four groups are: (1) qualitative, (2) quantitative, (3) chronological, and (4) geographic.

Qualitative

A qualitative distribution is one in which the difference between the items is one of kind rather than amount. Each item has a single numerical value applying at a single instant of time and the order

or arrangement of the items in the series is purely a matter of choice. The difference between the values is due to the difference in the items and usually is reflected in a difference in the units of measurement.

The outstanding characteristic of the qualitative series is timeliness. As mentioned previously, the values of the items in the series apply to a single instant of time. Consequently, the qualitative distribution is generally used for current releases—especially newspaper and radio. It also is exceedingly useful in increasing the interest in, and usefulness of, regular office publications. Especially is this true of local area data. The farther from the instant of time at which the measure is taken the less becomes the value of the series, although this is less true of agricultural data than of other types. Short qualitative series make ideal textual presentations and neither a table nor a chart is necessary.

The qualitative distribution is definitely the least suited of the four groups to simple graphic representations. Where the units are unlike, newspaper and magazines often use a type of chart called a pictogram—where small drawings representing the items in the series indicate unit of value. These diagrams owe their effectiveness to appeal since the small drawings usually bear close relation to the item being pictured.

Quantitative

A quantitative series is one in which the items show variation in frequency or variation in amount or value. Often only the characteristics of one item are measured. The arrangement of the series is determined by the measureable characteristics of the data. The majority of series falling within this classification are frequency distributions in which the order is determined by the class intervals extending from the lowest to the highest or the highest to the lowest.

To effectively present quantitative data at the local level all three methods of presentation are needed. Adequate textual explanation is an absolute essential, for it is almost impossible for the non-technical reader to establish the significant features of a frequency distribution. At the local level this explanation must be simple, and often minor variations must be omitted so as to avoid confusion. In the more technical publications the variations can be stressed. However, even carefully written explanations of the

quantitative series may become very involved unless a reference table is handy. The text should give the explanation, but the table should give the actual measurements. Certain types of charts can emphasize the important relationships existing in the series and thereby add much to the presentation. Although the choice of charts which can be used is decidedly limited, the effectiveness depends so much upon the type selected that the dangers of improper chart selection are greatest for the quantitative series.

Because effective presentation of the quantitative series requires text, table, and chart it is seldom useful for release to newspaper and radio. Its greatest outlet is in the regular official publications, in bulletins, particularly the bulletin dealing with specific topics rather than agriculture in general, or in speeches where lantern slides may be used. Timeliness is less a factor in the quantitative series than in the qualitative distribution. In most cases, the quantitative series, at least if they are measurements of large universes, are relatively slow to change. Once established the presentation can be used over a rather long period.

Chronological

Where a time element determines the arrangement of the items in a distribution, those data are classed as chronological and commonly called time series. Both qualitative and quantitative data become chronological when time becomes more important than the individual items or their characteristics.

At the local level, the chart probably ranks foremost among the methods of presenting chronological agricultural data. Undoubtedly, the primary reason is the extensive use made of presenting chronological data in chart form. People have long become accustomed to seeing this type of data presented in simple line graph or in bar chart. Only a little explanatory text is necessary—often times no more than a paragraph. Tables are least necessary.

It would seem that timeliness ought to be a very important factor in presenting chronological data but this not is necessarily true. People are interested in history and the chronological series presents history in statistical form. Naturally the chronological series which has a small time interval and which can be kept up currently offers more than the series with a much longer time interval yet there are but few series which are more popular than those of the United States Census which are published no oftener

than five years. The last figure remains "new" until another appears. This fact makes the chronological series peculiarly well adapted to bulletin presentations.

Geographical

When the items in a series refer to specific location, the data are geographical. As a general rule the fact that data are on a geographic basis often determines the arrangement. The distinction between the geographic and other series is fairly important because of the difference in chart types which must be selected to properly portray the data. What may be satisfactory for the chronological series may fail to give proper emphasis for the geographical series although the two distributions may be virtually identical.

Graphic presentation probably ranks first as a method of presenting agricultural data falling in the geographical classification. Tabular presentation probably ranks second and the text third. Chart-text combinations are far superior to table-text combinations. The reason is obvious. Most people have difficulty visualizing locations. Especially is this true at the local level. Very few people, for example, can place on a blank map the names of all the states of the nation; even less can name the countries of the world. Even though the interests of people are principally in local areas, the number who would accurately place the counties of a state in their proper location is not large. Whereas these people may know the names of the minor units within their respective counties (and that is doubtful) they are unfamiliar with adjoining counties. The map or cartogram definitely places the series in its proper geographic location.

Another factor not be be ignored is local area pride. People are usually proud of their particular locality whether it be state, county or town. They like to see it named and they are interested in comparing it with other areas with which they are familiar. For this reason graphic presentations—particularly those involving various types of maps—are especially appealing at the local level.

Timeliness is of little consequence in the presentation of geographic agricultural data. Distribution is emphasized, and, on the whole, major distributions tend to remain rather constant unless conditions change greatly. Of course, there is always more interest in up-to-date data but the geographical series like the chronological is always "new" until another measure is taken whether the in-

terval between is one year or five years. Thus the geographical series is ideal for bulletins where similar distributions may be compared. General agricultural publications use geographic data very effectively and practically always employ maps for presentation.

A Program of State Publications

A knowledge of methods is not enough. In order to make the material in agricultural statistics widely available in effective form, a program of publications which meets the local situation is also necessary. These may vary in different states, but the one in Wisconsin now includes the following:[5]

1. Current publication of recent information or short-time changes going on in agriculture. For this we use a monthly printed report entitled the "Wisconsin Crop and Livestock Reporter" in addition to weekly newspaper releases and regular radio reports.
2. A summary-type of bulletin which gives the general agricultural patterns of the state over a considerable period of time. These general agricultural publications have been published at relatively long intervals—usually from three to five years.
3. Special publications dealing with specific subjects such as a commodity, prices, etc., appear necessary from time to time to cover major fields on which data bodies need to be based. In Wisconsin dairying, poultry, and prices have had this special treatment.
4. An integrated series of county publications to be repeated at five year intervals with supplements for intervening years. Under state statute these are now prepared for each Wisconsin county and distributed from the offices of county agricultural agents. They treat the statistics for the county in terms of its history, geography, and general economy, and provide an integrated summary of all the material for each county which has been found widely useful.
5. In addition to standardized output of material, some levels of use such as schools need special treatment in order to make the fullest use of agricultural data. For current data a school study and discussion sheet is prepared each month to accompany the "Wisconsin Crop and Livestock Reporter" for school use. These have greatly increased the use and effectiveness of this report for teaching purposes. In order to provide for some uniformity in the use of the county material in schools a standardized study guide under the title "Know Your County" has been made available which provides study units which can be used in each county. Probably similar treatment of state level material is needed, but has not been worked out.

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[5] This JOURNAL, XXI, p. 734, Footnote 50.

Conclusion

Although the greatest difficulty with presenting agricultural data at the local level is in the lack of adqeuately trained and experienced personnel, there is no reason why more should not be done about getting information out of the files and into the hands of those who need it. There more information that is made available, the greater will become the demand. The greater the demand the more quickly will come the trained or the training of personnel. It is largely a matter of getting started—of having an idea and then finding some way of putting the idea to work.

DISCUSSION*

LESLIE M. CARL
Bureau of Agricultural Economics

A true missionary is one whose objectives are to provide the spiritual education best suited to the needs of the people. If he obtains these objectives he must be a propagandist of high rank. So the one whose objectives are the dissemination of agricultural statistics must fully visualize the field of need so that in a position as educator he may be able to apply the highest principles of propaganda, not to create additional need, but rather to bring all the latent universe of needs into touch with every type of available statistics.

The comprehension of, as well as the interest in, statistics by certain classes of users and readers is so superficial that they be presented in story form. Another group is comprised of the interpretative analysts who need related facts for measuring achievements in agriculture. The historical minded group requires a review of the facts associated with varying series of past events.

When attention in the press is called to certain agricultural achievements, the public has an interest in their progress or decline from period to period, and sometimes awaits anxiously the story on developments through the current season's future. This sympathetic interest should be cultivated as an integral part of the program of presenting agricultural information to the masses. At least a few readers have the conscious desire for self-education rather than pure entertainment.

The interpretative analyst endeavors to measure agricultural achievements by compounding the various elements of relationship which may have positive or negative bearings upon his problem. This class of users of statistics frequently finds work side-tracked because of a need for certain combinations of data. A recent publication by the Iowa Crop and Livestock Reporting Service was of value in such instances through a graphic

* A discussion given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 13, 1948.

presentation of an index of livestock production. The graphic formula was assisted by the statistics needed for the analyst or even the casual reader to make prompt interpretations. This presentation gave in sufficient detail the data relating to livestock, poultry and dairy production by counties so that the relative position of any single county might be readily discerned for either the individual classes of production or for the combination of all classes in one general group.

In such graphic contributions, series of statistical measures of historical events are pre-digested, or put into such a modern attractive package that any class of reader will immediately fit the commodity to his needs.

When agricultural statistics are being submitted to the public, the writer should keep in mind that, at the receiving end, his product will be treated in one of three ways. It will be consigned to the every-ready wastebasket, crammed into some bulging file case and never again see the light of day, or become thumb-worn, dog-eared, and kept available where it gives the utility for which it was intended.

One of the most interesting phases in the educational and publicity program of the agricultural statistician is that of forecasting the distribution of current information through the medium of the press. All editors and publishers do not have the same conception of value upon a news article as the writer. A study of the several classes of daily and weekly newspapers in Iowa with respect to their circulation area as well as their date of issue, gave the over-all concept of publisher policy. Personal interviews with farm editors of the large dailies as well as with the "Jack-of-all-trades" publisher of the smallest weekly paper directed us to the viewpoint of local interest. It then became the job of the crop news writer to use a style of advertising in his headline and lead that would sell his product to every class of news publisher. A tally of newsclippings revealed a consistent circulation in 85 or 90 percent of the counties in the State thus proving the value of a thorough analysis of the news field in advance. Current releases obviously are "spot news" and give a current picture in a broad scope with details reduced to a minimum.

Sometimes too much reliance is placed upon a compendium of historical events such as *The Yearbook of Agricultural Statistics* as a measure of perfection in statistical presentation. It meets the requirements of certain groups of users, but it must be recognized that such a publication of straight run statistical tables is not for current news purposes because it is out of date before the printers ink has made the first imprint.

The Iowa Crop and Livestock Reporting Service utilizes this standard method of tabular presentation, recognizing its utility as a historic reference for processors of agricultural commodities but knowing that as soon as the processor received the printed publication, he would begin calling to bring the tables up to date. One such reference bulletin was published about 5 years ago, and requests for renewing the data are still received occasionally.

One type of historic reference has current value. A number of states have conducted annual farm census enumerations for a long period of years. These census summaries afford to the marketing agencies and proc-

essors information as to important producing areas for the crop season in the immediate past, and also a distribution concept of the expected production in the current season by comparisons with previous years. Further, the continuous series of these annual enumerations afford to the many county groups the only reliable measure of land use trends in their respective counties.

During recent years the demand for agricultural statistics for the State as a unit has been topped by the demand for measures of county and even township achievements. The series of reference bulletins for individual counties issued a few years ago by the statisticians in the Wisconsin and Iowa offices met with broad approval. Unless such county references can be brought up-to-date annually their value subsides. In trying to maintain proper balance in a program of county statistics, Iowa has been trying graphic presentations in which production was interpreted into units of relationship to land area, either average yield per acre, or crop land harvested as percent of farm land, or livestock numbers per 100 acres. Two such graphic presentations during the past two years had a wide public appeal beyond our expectation. All data shown was in terms of an index represented by 5-year average units showing the relative position of each county with respect to the state average. Major and minor areas of concentrated production were readily discernible as well as the relationship between counties. One such bulletin presented a crop production index and the other a livestock production index, and in recognition of the demand for this type of information, a similar picture of crop land utilization by counties and townships is now in the making. Any work done for the county level will meet with an increasing demand during the next generation.

In preparing this series of graphic summaries for Iowa, consideration was given to the fact that although the Crop and Livestock Estimating Service produces series of statistics covering reasonably well the field of crop and livestock production, there has been neglect in the field of research and current information relating to the marketing of agricultural commodities. Consequently in the preparation of these mentioned graphic presentations an attempt was made to project the pattern and scope to be of value to processors, producers, and all groups which have reason to be interested in the field of marketing. The demand has increased quite rapidly for research that may promote an efficient movement of agricultural commodities from the farm into consumptive channels.

A knowledge of the sales territory and the capacity to absorb grade A and grade B commodities is of first importance to the distributor whether in a selling program or in presenting agricultural information to the general public.

ROUNDTABLE ON FATS AND OILS

Chairman: Oscar A. Day, Wilson and Co.

OUTLOOK FOR WORLD FATS AND OILS PRODUCTION AND USE*

W. H. Jasspon
Perkins Oil Company

AFTER World War I the opinion was widely held by Government experts that fats and oils would continue to be scarce—and high—for many years. Within a few months following the 1919 bulge prices declined violently. A high official of that era, when asked to explain what happened, stated simply but realistically, "We underestimated the ability of the people to do without." Is history repeating itself?

Statistics continue to show a mathematical gap between world supply and demand. Many predict again it will take years of high prices to bring about a balance. No one denies that there is a dietary deficiency in many parts of the world. There always has been. It is agreed that population is increasing. Against these arguments, when it comes to assessing price trends, it is necessary to weigh the incentives of price and recovery as influences on increased production. Nor can we ignore the cruel fact that most large consuming nations cannot afford to purchase fats freely, even if extra quantities were now available.

For many years before World War II, fats and oils were relatively cheap. There was no occasion for conservation. Used fats were seldom saved for reuse or sale. International trade was comparatively easy, and low prices induced large inventory accumulations.

It is appropriate to examine the changes which are taking place in the world pattern. It may be too early to evaluate their ultimate impact on our own new pattern of production. We shall have to find export outlets if we are to produce at current capacity.

The Philippines have more than restored their prewar position as producers of copra. Credit for the rapid resumption of this trade is due primarily to the organized activities of a group theretofore engaged in the business. They created a non-profit development corporation, with the approval of, and aided by, the U. S. Gov-

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

ernment, which provided the implements of rehabilitation. It is an excellent demonstration of what experienced people can do. While several hundred thousand tons were lost as a result of a typhoon in late 1947, full-scale production may again be expected during the coming year. Other areas of the Orient and South Pacific have not made such progress due to political disturbances, as well as price and marketing controls, all of which have retarded all-out activity.

India was a primary source of export supply before the war. The tendency there, as in many agricultural exporting nations, is to industrialize and channel an increasing share of the products into home consumption.

Argentina calls for more elaborate explanation. It has been one of the lowest cost producers of cereals and oilseeds, principally flaxseed. It supplied a major part of the world's linseed requirements, prewar. Its export price set the world's market. The United States was dependent on such imports, which averaged around 18,000,000 bushels annually in the 1935–39 period. However, in 1946, the Central Bank, aware of world shortages, and being dissatisfied with its position during the war, took over under a decree practically all of the exportable agricultural production of field crops. It became, in effect, the sole buyer. It fixed a price to the producer of about $2.26½ per bushel in terms of the U. S. dollar, for flaxseed. The exportation of flaxseed as such was prohibited. A National Agency became the sole seller. It set price levels at an all-time high, which influenced prices throught the world. This State operation, until recently, provided huge and quick profits. But it served notice to the world that Argentina could not be relied upon as a primary source of supply, as long as it exercised a dictatorial State control over exports and prices. Unless its present policy of a State controlled economy is reversed, the effect will be a permanent impairment of its basic economic system.

Until very recently Argentina has shown no disposition to change its arbitrary price policy. Inventories have been permitted to pile up without regard to the possibility that Argentina could no longer dominate the market. The present stock of linseed oil there is estimated at 150,000 metric tons. There are also some export stocks of edible fats and huge quantities of oil cakes, all owned by the trading agency. Many linseed mills have ceased to operate because no further storage is available. Planters have been urged to cut the

flaxseed acreage in 1948 even further, in an attempt to extricate the Government out of the full consequences of its ill-advised venture into the commercial field. Prewar acreage was around 7,000,000 though in 1936–37, over 8,500,000 acres were planted. Production this year is about 850,000 metric tons on slightly over 4,000,000 acres, though over 2,200,000 tons of flaxseed were harvested in a single year (1931–32). Price does influence production.

There have been further effects of its state-planning policy. It compelled the United States to become a self-sufficient producer. It induced Canada and Mexico to increase production for world markets. These efforts have been so successful that these three countries will have substantial surpluses for export this year. The Argentine policy has been the direct cause of a flaxseed program in French North Africa. England has begun to grow flaxseed on a commercial basis. Even smaller countries, like Sweden and Denmark, have undertaken to grow flaxseed for crushing. This approach to national self-reliance is against the interest of a sound international trade economy. It forces governments into underwriting unnatural and high-cost production. But until Argentina accepts the doctrine of dependable large-scale production and free marketing the present trend will continue.

By this time bountiful harvests here and in Europe must have impressed the Argentina officials that they have over-played their hand. The press reports some criticism because of our refusal to grant dollar credits through ECA for the purchase of Argentine surpluses. The British, and other countries to a lesser degree, bailed them out in 1946 and 1947, under stern necessity. Now they want to high-pressure us into rescuing them from their self-made dilemma. This is too high a price to pay for goodwill. Argentina can earn dollars legitimately when it resumes its natural competitive position for the U. S. market. Regardless of representations from diplomatic sources ECA cannot justify the allocation of funds to buy commodities in other countries when they can be procured here. I view with some misgivings its recent allocation of dollars to European countries to purchase oil cakes in other Latin and South American countries, when we will be confronted shortly with a domestic surplus.

Argentina may decide to sell its present stocks to Europe in the near future, either through credits or in the currency of the country. It cannot hold out indefinitely.

The over-all fats and oils position in nearly all European countries shows improvement. European nations having colonial possessions control their exportable supplies. In some colonies open dissatisfaction is quite pronounced over the low prices paid to them as compared with prices paid heretofore in free markets. It has interfered with maximum output. The production of whale oil has reached the level permitted by international convention.

England has materially added to its stock pile from the low of 1946, despite an increase in its fat ration of one ounce per week within the past year. Empire harvests, coupled with supplies from sterling areas, should be sufficient to obviate the necessity to allot ECA dollars for the purchase of fats and oils.

The French stock is low, and France will have to be a claimant on free supplies for about one-third of its current ration. It has made some progress in expanding production, in addition to flaxseed. It expects to provide about 35,000 tons of oil from rapeseed grown in metropolitan France this year. Rapeseed was not produced in quantity for many years prior to the war. The Germans induced its cultivation during the occupation. Since the war, high oil prices and lack of exchange have made it attractive to farmers to grow this crop. A peanut project is being proposed for French West Africa.

England is at work on a similar development for British West Africa, and a huge peanut acreage is being readied in British East Africa. While progress has not been as rapid as anticipated, full-scale operation is expected by 1952, to yield between 250,000 and 300,000 long tons of oil annually at that time.

European livestock rehabilitation at an accelerated pace is assured by excellent feed crops. Large tonnages of proteins will also be available. The question is, how much can they afford to purchase.

Brazil is another area capable of expansion in oilseeds. In the North, babassu nuts (a species of palm) are in vast supply. Large-scale operations were held back, before the war, by the then prevailing low prices. The lack of a cheap and efficient nut-cracking process, the need for good roads and transport equipment are also important factors. But if the price incentive is sufficient, these technical and mechanical difficulties will be solved. In Southern Brazil the peanut harvest this year is estimated to yield over 200,000 tons, as compared to about 20,000 tons in previous years.

Practically every importing and exporting country maintains state controls in varying degrees. Such restrictions, coupled with the lack of confidence in the official rates of exchange for the currencies of many countries are handicaps to full recovery. Bilateral or barter deals stem from these causes. This makes it difficult and often unrealistic to translate stated prices in terms of the dollar.

The United States, according to present estimates, will produce a much larger exportable surplus of fats from 1948 crops. Lard production should also begin to increase by the end of first-half 1949. Unless producers are to receive unexpected low prices especially during the heavy marketing period, except where the support prices are high, as in the case of flaxseeed and peanuts, it is essential that a realistic program for export be formulated and approved without further delay. The bulk of such exports will have to be financed by ECA funds. A large quantity will probably be requisitioned by the Army for occupied areas.

Except for the possibility at this time of low prices, the various nations participating in the Marshall plan will request minimum supplies of fats and food items, as there are many claimant agencies in each country who require dollars for other goods and materials. It is likely that the aggregate requirements (including the Military areas) can absorb whatever fat surplus may be offered by the U. S. However, it is doubtful if Europe will require the prospective world surpluses of oil cakes, unless the price is so low that they may consider its use as a fertilizer. Recently the Food Director of ECA expressed the opinion that larger cereal exports were possible in view of the increased crop estimates. (I assume he would take the same position with respect to fats and oil cakes.) The Secretary of Commerce issued a statement as being opposed. He wanted the consumers here to have a "break." He was either unaware, or deliberately overlooked the fact, that the day he used this springboard in an obvious bid for votes, both wheat and corn, new crop, were selling below the minum prices the Government guaranteed producers. The Department of Commerce should not have the legal power to veto an export food plan initiated by the Department of Agriculture. It does not make sense, and the law giving Commerce this right should be revoked by Congress.

My purpose in highlighting some of the forces at work in the world is to focus attention to the price problem confronting producers of oilseed crops here; and to the need for the Government

to formulate a practical policy, first, concerning the disposition of the surpluses arising from this year's production; and, second, to create a sensible program as to what it proposes to do about the 1949 production. Obviously one has a distinct bearing on the other.

For purposes of discussion, I shall make several suggestions in connection with our domestic situation:

1. I believe it is sound, at least for another year, to encourage oilseeds production. At this time, it is fair to assume that oilseeds in 1949 are more likely to be in greater demand than the additional tonnages of cereals and feed crops, which would be grown on most of the acreage withdrawn from oilseeds. We must insure our own needs, and can afford to insure some of the world's requirements at reasonable support price levels.

2. The Government should have the courage to allocate exportable quantities, *before* these surpluses pile up as they have in Argentina, or sell at unduly low prices. Large stock piles are an unnecessary burden, as long as production is encouraged. The producer, processor, and ultimate buyer are all entitled to know what demand they can expect *in advance* of heavy seasonal marketing, as long as Government exercises controls which restrict free trading.

3. The whole question of export controls should be re-examined objectively. There is ample justification for relaxing controls or limiting them to special conditions. In many commodities they may be eliminated entirely. As I have already stated, the greater share of exports is already controlled by dollars set aside by ECA. We should not limit or regulate imports by our Latin American neighbors, who are our regular customers. It is time to demonstrate our professed faith in freeing trade, not in freezing it. It is wrong to use either the allocation or power veto to impose in effect a form of price control.

ANIMAL FATS AND OILS—SITUATION AND OUTLOOK*

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THE animal fats and oils outlook is of vital importance to livestock producers as well as to the entire livestock and meat industry. It is also of real interest to producers and processors of competitive fats and oils, and to the general public, as a factor in their cost of living. This paper (within the space limits available) will take up (1) the current animal fats and oils situation, (2) the probable situation in 1949, and (3) the outlook for the next decade. Emphasis will be placed upon the long-range outlook, with special consideration of the major favorable and unfavorable factors that may affect the *relative* supply and demand situation for animal fats and oils in the 1950's.

Current Situation

The wholesale price index of 27 fats and oils currently (August 1948) is 18 percent below the peak in January 1948, but it is still about 2½ times the levels which prevailed during the immediate prewar years (1939–41). Inedible beef fats show the least advance over prewar (about double), butter has advanced about 2½ times, while prices for edible beef fats and lard are slightly more than triple the 1939–41 average. During this same period the wholesale price of all foods advanced about 2½ times, while the all commodity index is a little over double the prewar level.

Consumption of the four major edible fats—lard, butter, shortening and oleomargarine—in 1948 will be about 38 pounds per capita. This is about the same consumption as last year, but it is about 5 pounds less than the prewar (1939–41) average per capita consumption. Lard consumption in 1948 will be about 12.5 pounds per capita, which is about 7 percent less than prewar (1939–41). Butter consumption is expected to be about 10.2 pounds per capita this year, or nearly 40 percent less than the prewar average. This reduced per capita consumption of animal fats

* A paper presented at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948. The author wishes to acknowledge the helpful assistance of Mr. J. Russell Ives, of the American Meat Institute, and other economists in the meat packing industry, in the preparation of this paper. The views he expresses, however, are his own.

is largely a reflection of the sharp drop in production, especially of butter, and the increase in population over the prewar period.

Outlook for 1949

On the supply side, the outlook for fats and oils in the coming year is dominated by the exceedingly favorable crop conditions which have prevailed during the present growing season. Not only will the 1948 crop of vegetable oils exceed the previous crop by a wide margin (about 19 percent), but once again we have an abundant supply of feed grains in prospect for increasing livestock production and the output of animal fats. The protein supplement derived from the oil seed crops also will aid in the expansion of the livestock production which will follow this year's bumper harvest.

Of course, livestock numbers cannot be expanded immediately. There even is some question as to whether or not the downward trend in cattle numbers will be halted by 1950. However, it is quite certain that more grain will be fed to beef cattle and milk cows in 1949 than during the current year, and this should mean a greater output of beef fats and of milk. The prospects for butter production in 1949 is an interesting question. With probably somewhat more more milk and smaller foreign demands for milk products, one might expect a considerable increase in butter production next year. However, if consumer purchasing power continues at or near its present high level, it seems highly possible that this increase in total milk availability could easily be absorbed in increased consumption of fluid milk and ice cream.

Although hog production certainly will expand in 1949, hog slaughter in the coming marketing year (beginning October 1) already is largely determined by the size of the 1948 pig crop. Total slaughter in 1948–49 may differ very little from the preceding year, but weights to which farmers feed hogs may be quite heavy, because of the abundance of feed and expected favorable feeding ratios. We estimate that next season's lard production may total a little larger than in 1947–48, but production of all animal fats will be off slightly from a year earlier.

The demand for domestic fats and oils in 1949 is, of course, closely tied to the general business situation and consumer purchasing power. As yet there are no signs of a material weakening of these factors, at least through the first half of the year. The sharp increase

in the production of vegetable oils will make possible increased output of manufactured products competing with animal fats. Moderately larger imports of tropical oils may also materialize in 1949, although the entire export-import situation for fats and oils is dependent upon future Government policy in this field. The Government should be taking steps (thinking in terms of long range policy) to encourage or at least permit the development of export markets for United States fats and oils. This is especially important because of the potential large supply of animal fats as our meat production increases.

The Long-range Outlook

A comprehensive statistical evaluation of the long-range outlook of animal fats and oils is beyond the scope of this paper. An effort has been made to outline some of the major *favorable* factors affecting the *relative* supply and demand for animal fats compared with vegetable oils (pros), and to some of the major *unfavorable* factors affecting the *relative* supply and demand for various animal fats (cons) during the next decade 1950–1960.

Needless to say, the *absolute* level of lard prices will hinge importantly upon the total supply of all fats and oils, including imports and the multitude of factors affecting the general level of prices, employment and business activity, as well as the 10 percent increase in population expected by 1960. For the most part, I have only generalized, and no generalization can be more than a partial truth. It is hoped, however, that the points listed will serve to stimulate additional interest in further research in this important field.

I. *PROS* (factors tending to *strengthen* the relative supply and demand position for animal fats).

1. *Improvement in the nature and the adaptability of animal fats.* One of the most startling and most recent developments in the field of improving animal fats is the discovery of new antioxidants which improve the keeping quality of lard. One such new product, known as AMI 72, and developed by the American Meat Institute Foundation, at the University of Chicago, when added to lard protects products such as potato chips, crackers and pastries from rancidity on grocery store shelves and in the home, for a period much longer than heretofore has been possible. It also has the fortunate charac-

teristics of being readily fat soluble, easy to add to lard, requires no special equipment, and is inexpensive, adding only a fraction of a cent a pound to the cost. The antioxidant also greatly increases the keeping qualities of lard itself. When kept at room temperature and exposed to air, the keeping time of lard by the use of AMI 72, was increased from a period of 4 months to periods ranging between 26 to 31 months. This development, along with the research work which has resulted in the modification of the physical properties of lard by either adding lard flakes or by partly hydrogenating the entire lard, and permitting its mixture with vegetable shortening, is an extremely important one which should strengthen the relative position of lard over the next decade. It will permit the use of lard in the rapidly expanding "mix" field. When this important stride forward is combined with the trend toward a better and more convenient package and more aggressive merchandising for the home market, as now seems probable, we will have to list our first point as one of the strong plus factors on the side of this important animal fat.

It is my understanding that parallel developments for butter are under way, which should result in a further improvement in this other major animal fat product.

2. *Increased emphasis on lean hogs and lean beef.* Experimental work at various colleges and on the part of animal breeders is resulting in slow but sure improvement in the type of hog that, when marketed at light weights, will give an increasing proportion of the more valuable cuts, hams, loins and bacon, and a decreasing proportion of lard. To some extent, this is being aided by the increasing supply of the high-protein soybean oil meal, increased use of better legumes and grasses, and more emphasis on soil conservation. Further progress should be made in the next ten years in the development of a higher protein corn. In fact, it seems clear that the increased emphasis on leaner hogs and perhaps leaner beef will, in part, be stimulated by the relatively unfavorable position of animal fats themselves. It is a well-known fact that the average weights to which hogs are fed affects importantly the supply of lard and fat cuts. Due to this fact, and the fact that the average amount of feed required per pound of gain increase directly with market weights, it has been shown that a normal supply of feed (88 billion pounds of corn equivalent) when fed to hogs weighing 200 pounds, would result in 9.3 billion pounds of lean pork and 2.6 billion pounds

of fat. This same supply of feed, if fed to hogs averaging over 300 pounds, would give 7.3 billion pounds of pork and 5.1 billion pounds of fat.[1]

3. *Strong European desire for animal fats.* With the world population increasing at an annual rate of 20 million persons, reduced livestock numbers in Europe, and relatively low consumption of fats in many countries, there is no question that a strong desire for some of our animal fats exists abroad. The basic problem, of course, is: What will we take in exchange for these commodities? It is not a question of world needs, but a question of whether or not foreign countries will be able to pay—and this looks none too hopeful. It is understood that many countries, especially European countries, prefer lard which (to the extent that they have purchasing power) should favor the relative position of this animal fat. It will be recalled that just a year ago, the FAO concluded its discussion of the European fats and oils situation with the following statement: "The low level of fat production in Europe, combined with the acute world shortage of fats, is responsible for a serious decline in fat consumption in Europe, compared with prewar, than perhaps in any other food."[2]

Also, in his recent testimony before the Senate Committee on Banking and Currency, Secretary of Commerce Charles Sawyer emphasized a continued world shortage by saying: "World demand for fats and oils continues to be greatly in excess of supply. Before the war, world net exports of oilseeds, butter, oils and fats, averaged 5.8 million metric tons annually (fat equivalent). This amount was reduced to 3.45 million metric tons in 1947, and a favorable estimate indicates that about 3.8 million tons may be available for international trade in 1948. Without allowing for increased world population, the present international trade in fats and oils results in a deficit of about 33 percent."

4. *Aggressive research in the direction of developing industrial usage of animal fats.* The possibilities of industrial use of fats is a topic that is so new that no definite conclusions can be drawn. Research to date has indicated that the breaking down of fats into their various components might open up an entirely new use in plastics and other synthetic fields. To some extent this develop-

[1] Source: *Feed Consumption and the Production of Pork and Lard,* Technical Bulletin No. 917, June 1946, United States Department of Agriculture.

[2] The State of Food and Agriculture, FAO Conference, August 1947.

ment would eventually apply to all fats, but in the interim, it appears that animal fats would receive the greatest benefit.

5. *Possibility of stock-piling animal fats.* This possibility arises basically out of the new technical developments referred to in (1) above, which permits greatly increased keeping quality of animal fats, and may be stimulated during some period within the next ten years by the pressures arising as the result of the attempt to support hog prices. The Government may justify such a program on the grounds of National Defense, since it is true that the storage of fats requires little space relative to the number of calories involved, and that fats have considerable flexibility from the standpoint of mobility and usage during a period of emergency. It is significant that coconut, palm, and tung oil are among the list of strategic and critical materials listed for national stockpiling by the Munitions Board.

II. *CONS* (factors tending to *weaken* the relative supply and demand position for animal fats).

1. *Downward trend in the relative price and relative consumption of lard as compared with shortening over the past 25 years.* The total consumption of lard and shortening per person in the United States has tended to be fairly constant over a period of years. Our study shows that lard production tends to fluctuate up and down depending upon the size of the pig crop, and feed conditions, which in turn, along with the declining export market, has affected its domestic consumption. Shortening production tends to take up the slack. However, since 1920 in spite of a definite downward trend in lard consumption, as compared with shortening, the relative price of lard to shortening has dropped at the rate of over one-half percent a year. This progressive loss of favor of lard, compared with shortening was shown by Dr. A. B. Paul of the University of Illinois,[3] and is confirmed by our own study. This means that consumers are not as easily attracted away from shortening by falling lard prices as they used to be. Therefore, if this pronounced trend continues, even at a more gradual rate, increasing supplies of lard will result in even greater relative discounts compared to shortening over the next decade.

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[3] *The Changing Character of Shortening Products*, Dr. A. B. Paul, Illinois Farm Economics, November, 1947.

2. *Downward trend in the relative price and relative consumption of butter as compared with margarine in recent years.* There has been a similar downward trend in the relative consumption of butter as compared with margarine over a 25-year period. This trend has been accentuated in recent years by the high domestic consumption of milk, cream and ice cream, and exports of dried milk and milk products, which has decreased butter production. In contrast to the unfavorable lard versus shortening price relationship, the trend has been upward in butter prices relative to margarine, until very recently. However, within the last two years this price relationship has shown a sharp drop indicating an increased acceptance of margarine relative to butter. It appears that butter producers may have to adjust themselves to a new level of relationship between butter and margarine. This will be especially true if the proposed removal of the Federal tax on margarine becomes effective and if butter supplies show increases over present low levels.

3. *Downward trend in the relative price of inedible tallow as compared with coconut oil.* Our study shows a definite downward trend in the price of inedible tallow relative to the price of coconut oil and other foreign oils. This appears to be largely the result of an increasing supply of inedible tallow and grease, which has nearly doubled since prewar. The trend in inedible tallow and grease consumption, when compared as a percentage of the total fats and oils used in soap, is distinctly upward. This suggests that inedible tallow and grease is holding its own in competition with the foreign oils, and its future relative position depends largely upon the supply. Nevertheless, with the rapid development and increased public acceptance of detergents with a petroleum base since 1946, this major animal fat also faces a somewhat uncertain future. Trade reports indicate that about 10 percent of the soap market has been captured by such detergents, but a more accurate comparison on the inroads of petroleum must await the publication of this information by the United States Department of Commerce.

4. *Consumption of lard and fat cuts do not respond to price changes as much as many other foods.* The fact that the consumption of lard and fat cuts does not respond to the price changes as rapidly as meat and many other foods, is an important factor that must be listed on the unfavorable side of the equation when viewing the future relative position of lard. This significant fact was pointed

out by Mr. Oscar G. Mayer[4] who indicated that the failure of the fat group to respond to price reduction is explained by the human physiological demand for fat which, while insistent up to a certain point, is highly inelastic beyond this point. This tendency also has been demonstrated clearly by the relatively stable total consumption per capita of lard and shortening, and butter and margarine, as explained in points 1 and 2, and by the decreased relative demand for fat cuts in the South. Also of importance is the fact that studies show that fat consumption for each income group in the United States is substantially above each group's basic fat requirements.

Looking at the future, this fact is especially significant since the relatively strong demand for meat and probable abundant supplies of feed will encourage hog production which will tend to increase the supply of lard—a joint product. The unfavorable relationship of lard, resulting from a large supply, thus even may be accentuated by a decrease in cotton and soybean acreage. Decreasing acreage of these crops would result from a more prompt response of production to diminishing demand prospects for their products and increased competition from foreign imports of tropical oils. Despite the long transportation from southeast Asia to the United States, coconut oil and palm oils seem to hold a definite advantage in relative cost (aside from the cost arising from trade restrictions) over temperate zone oils which can be used for similar purposes. Extensive wartime plants of the oil palm in the Belgium Congo will come into bearing before 1955, and the somewhat less favorable outlook for natural rubber in the Netherlands East Indies and British Malaya, seems to favor greater vegetable oil production in this area.[5] The relatively strong demand for protein feed, however, may be an offsetting factor keeping soybean acreage at a high level.

5. *Development of processing techniques for fats and oils has tended to make less important the peculiar characteristics or adaptability of any of the individual fats.* The rapid advances in the understanding of the chemistry of fats and oils is tending to work in the direction of making them more and more substitutes for each other. This definitely places the animal fats at a disadvantage since the basic cost

[4] "Some Observations on the Economics of the Meat Industry," Mr. Oscar G. Mayer, President, Oscar Mayer & Co., Inc. An address made by Mr. Mayer at the 34th Annual Convention of the Institute of American Meat Packers, October 20–24, 1939.

[5] Source: *World Trends in Major Oil Crops*, United States Department of Agriculture, March, 1946.

of land and labor resources is greater than in the case of vegetable oils, and since historically their particular characteristics have aided in placing them in an advantageous value position. A current exception is soybean oil where flavor stability is cited as a problem requiring continued research. Continued advancement in processing techniques of this nature will work towards making one fat a complete substitute for another, even more than is now the case. For example, in some areas of the South, cottonseed oil is used as a partial supplement to the butterfat in ice cream. On the other hand, the wide differential in fats and oils prices last spring indicates there is still considerable price independence. This widening of the adaptability of all fats and oils may result in an especial hardship on butter, which had had a definite relative price advantage over a long period of years, but will also affect lard.

Conclusions

The pros and cons outlined above do not lend themselves to thorough statistical measurement. Furthermore, there probably are a large number of additional factors (many unknown at the present time), that will tend to affect the future relative position of the animal fats. Therefore, an exact forecast cannot be made on just how these pros and cons will balance themselves out over the next 10-year period. My conclusion would support the view that the pros will modify past trends but do not fully offset the cons and that the animal fats face a real challenge in the decade ahead.

DISCUSSION

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I agree with Jasspon that the problem of consumption is not one of basic human needs but rather one of purchasing power. I thoroughly agree with his last recommendation, that we should relax our export controls. We are committed to general freedom in markets within this country and should not allow export controls to be used as a subterfuge to influence domestic situations. The surest road to domestic control is rigid export control.

With Eggert's general position that the relative price position of animal fats may be weak, I also concur. An exception should be made for butter, which I will discuss later.

Mr. Day asked me to comment on the competitive situation in fats and oils. Does competition now prevail? World trade in these commodities is affected by export and import controls, price ceilings and floors, long-term

fixed-price contracts, rationing, etc. For example: Our 1948 crop of soybeans is now estimated at 206 million bushels, a very large crop, and total supplies of all oil seeds will produce oil and meal well in excess of our needs. Europe is short on fats and protein feed, and the cheapest way to ship these products from this country is as bulk soybeans. Europe has the equipment to process them since formerly large quantities of Manchurian soybeans were imported. But to export soybeans our government must issue export permits. Competition is not allowed to operate.

Fats and oils may be grouped into several broad classes. No two oils are precisely alike. For some uses a particular oil is sought; for others much substitution is possible. Four broad classes of use are: (1) edible and culinary animal fats: butter and lard; (2) edible and culinary vegetable oils: cotton seed, soybean, corn, peanut, and olive; (3) the drying oils for paint and other quick-drying purposes: linseed and tung; (4) the soap fats and oils: tallow, palm, and coconut.

In view of substitution over-all figures have value. Let us consider the world picture. World output for 1947 was estimated at about 15 percent below prewar, but with the growth in population per capita supplies were about one-fourth below prewar. The "ability to do without" was large. World trade was even lower, in 1947 about 50 percent of prewar, but will be higher in 1948 because of larger supplies.

There are four basic gaps to fill: (1) the loss to the Western world of exports of Manchurian soybeans; (2) the decline of India as an exporter; (3) the failure of the Netherlands Indies to export in prewar quantities; and (4) the decline in indigeneous production of animal fats.

Considering these in order: (1) the only western country that displays any vigor in developing a soybean industry is the U.S.A., and we use most of our expanded output at home. Under competitive conditions exports from this country would fill part of the gap left by the shutting off of Manchurian supplies. (2) The Indian gap must be filled by increased shipments from elsewhere. (3) In time the Netherlands Indies will likely export above prewar quantities. A basic problem is the destruction of factories needed in production of palm oils. (4) Production of indigeneous animal fats will rise in the next 12 months in response to larger supplies of feeds. But it is unlikely that world feed supplies will permit as high per capita production of animal fats as in prewar years for any considerable period in view of increased population and the necessity of more grain for human use.

It seems likely that over the world per capita supplies of fats and oils may continue short in relation to prewar for many years. Prices will depend on economic conditions. A rising living standard would mean increased use of fat, if for nothing more than soap.

I shall comment briefly on a few competitive situations:

Butter and margarine. Economically butter is the superior food. Consumers both in the U.S.A. and in Western Europe will pay premiums for butter. In my grocery store I note butter is priced about twice as high as margarine. In the U. S. A. milk output has not kept pace with population and the increased use of milk and other dairy products so as to maintain per capita butter consumption; in 1948 it will be about 6.5 pounds less

than in 1938–41. One reason why this gap has not been closed by increased margarine use, estimated for 1948 at 3.9 pounds over 1939–41, or about 60 percent of the drop in butter, is the greater consumption of fat in invisible forms. Our increased consumption of milk and cream alone is equivalent to about two pounds of butter. Very likely, output of margarine may increase in the year ahead. Certainly consumers should have the right to buy it in a convenient form.

Outside the U. S. A. most people use whatever fats are available and so competition does not freely operate. More feed will likely increase butter output in Europe during the next year, but supplies of fats are so short that this will not affect total use of other fats. A chain reaction of displacement might finally mean more badly needed soap. The long pull is probably for more margarine and less butter, primarily because of increased use of milk in other forms.

Lard versus vegetable shortening. Here it is—hogs versus the cotton, soybeans, and peanut fields and palm trees. In the U. S. A. supplies have not been adequate to let consumers use either lard or vegetable shortenings in prewar quantities. These decreases have been offset at least in part by increases in invisible consumption of fats in meats, eggs, etc. Vegetable oil products will increase in supply in the next 12 months, and lard may decline in the next six months but increase sharply by a year from now

How about the longer pull? Lard is a minor by-product of a joint-product enterprise—hog raising—, and so our volume of lard is determined largely by the output of meat although it may be affected by both feeding and packing-house practices. Hog production will increase in the next twelve months. However, except for the wartime splurge when we converted our surplus CCC corn and wheat and part of Canada's wheat into pork, the hog industry shows no great tendency to expand. It depends on corn. Our acreage of corn is pretty well stabilized; hybrid corn has had its full constructive effect on yields and the adverse effect of its ability as a soil miner has probably not been fully reflected in yields. We can readily exaggerate the possibilities of large expansion in hogs and, therefore, in lard output.

Lard as a by-product must be priced so that whatever quantity is produced can be disposed of. A competitive market mechanism insures this. If we could tap the market which apparently has a preference for lard, Central Europe, we would have no trouble selling all our output. Prospects for doing this are beyond the scope of this paper, but they do not seem too bright. Likewise, the development of income-producing enterprises in the tropics, as for example sugar in Cuba and petroleum in Venezuela, provide increased outlets for lard.

Cotton, historically our largest source of food oil, is probably a contracting industry for a well-known reasons. Cottonseed is a by-product of a joint enterprise. Peanuts are essentially a food crop. Corn oil depends on volume of cornstarch and sugar. Coconut oil in the U. S. A. goes largely into soap because of its technical superiority. It is not a by-product but a tree crop with a long production cycle. Soybeans are grown solely for the major products—meal and oil—roughly of equal value. The rapid rise in this crop filled the gaps caused by the decline in cottonseed in the 1930's

and the wartime decline in imports of copra. The output of soybeans will depend on direct competition with the feed crops which it displaces. Adding a soybean crop in a rotation of corn, oats, and clover means less of these feed crops. The question is: Will the value of the soybean crop exceed the value of the displaced crops? In view of the high value of soybean meal as a supplementary livestock feed and the likelihood of continued demand for oils, assuming freer world trade, a large acreage of soybeans is likely to continue in the areas where the crop is well adapted.

Prices indicate soybean oil to be somewhat inferior as a food oil to cotton-seed oil. Increased output of cottonseed in 1948 will push soybean oil down the scale. We will likely export more and also use more in the competitive drying oil field where soybean oil can be used. Such use expanded greatly in the past year, partly as a result of a pegged linseed oil price. In view of the present very large spread between prices of linseed and soybean oils, further expansion in soybean oil for drying purposes is likely.

What has all this to do with the lard versus vegetable shortenings? The volume of supplies is of basic importance. Whether a commodity is a by-product or a main product, or has a strong or weak growth trend will influence its future volume. In the long run output of vegetable oils will likely increase more or be better maintained than will that of animal fats.

Another factor is consumer preference. Technical developments in producing a bland stable vegetable shortening and intensive merchandising caused shortening to gain in consumer preference over the older types of lards. The best evidence is comparative prices. That the meat industry recognizes this is evidenced by the intensive research recently done on lard and by the facts that the new lards look like shortenings and are packaged, and in some stores, priced like the well-known brands of vegetable shortening. Whether these new lards can overcome the lead of the vegetable shortenings in the battle for consumer favor, I do not know. We will at least have a more competitive situation.

Over the world the vegetable oils will likely gain on the animal fats. Our capacity to produce the grains needed to produce animal fats is lower than our capacity to produce tropical vegetable oils and field crop oil seeds.

One could mention many more competitive situations. Competition is keen among the paint oils. Certain oils have technical characteristics which cause price to be a small factor in certain uses but for rather broad classes of use price competition is keen. Likewise, much competition exists among oils in the soap field. The increasing use of synthetic detergents is an important factor which we do not have time to explore.

In conclusion I wish to express my personal preference—many people would say prejudice. The basic world economic problem is to increase output. The needs of over two billion people make this desirable. The sooner we can re-establish genuine competition in pricing, trade, and production, the quicker we will get maximum world production and better distribution. The fats and oil field is now infested with a great variety of governmental regulations. Easing in the supply situation should provide an opportunity for increased relaxation and final elimination of these regulations.

ROUNDTABLE ON LIVESTOCK MARKETING RESEARCH

Chairman: Geoffrey S. Shepherd, Iowa State College

RESEARCH INTO THE PROBLEMS INVOLVED IN MARKETING SLAUGHTER LIVESTOCK BY CARCASS WEIGHT AND GRADE*[1]

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University of Minnesota and Bureau of Agricultural Economics

THE marketing of slaughter livestock is the most important marketing activity with which the farmers of the United States are concerned. Cattle are kept on about 80 percent of the farms of the country, hogs on about 60 percent, and sheep and lambs on about 9 percent.[2] Although cattle are kept on many farms primarily for milk rather than for meat, the veal calves and discarded dairy animals from these farms produce about one-fourth of the combined beef and veal of the country.[3] The cash farm income obtained from meat animals accounted for over 26 percent of the total cash farm income from all crops, livestock, dairy and poultry products, and government payments during the years immediately preceding World War II,[4] and 32 percent in 1947.[5] Comparable figures for dairy products, which ranked second, were about 17 percent and 13 percent respectively. The efficient marketing of slaughter livestock will become increasingly important in the years ahead when farmers are likely to receive a much smaller proportion of the consumer's meat dollar than is the case during the present boom.

It is generally recognized that the physical operations in a modern meat packing plant leave little to be desired either from the standpoint of efficiency in slaughtering and processing or from the standpoint of utilization of by-products. It is in other areas between producers and consumers that greater efficiency is an urgent need.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

[1] Paper No. 2425, Scientific Journal Series of the Minnesota Agricultural Experiment Station, Contribution of the Division of Agricultural Eoncomics.

[2] *1940 Census.*

[3] *U. S. Dept. Agriculture Yearbook, 1922*, p. 284.

[4] *Agricultural Statistics 1941*, p. 549.

[5] *The Farm Income Situation*, January, 1948. p. 3.

There is a general lack of efficiency in the local assembly of livestock and in the movement of the animals to the place of slaughter. There is considerable duplication in services rendered by agencies handling livestock, and a wasteful use of feed in the "filling" process. There are weaknesses in the pricing mechanism and a tendency to generalize prices paid for slaughter animals instead of paying each individual producer the true value of the actual weight and grade of product delivered. Likewise there is need for improvement in the distribution of meat, and for the development of ways and means whereby consumer preferences can be brought into sharper focus than is the case at present.

For many years substantial emphasis at the state agricultural experiment stations has been placed on the nutritional requirements of slaughter livestock. More recently increasing emphasis is being given to work aimed at improving the genetic make-up of slaughter hogs. Significant results have been achieved from both of these important research activities.

Economic gains from improved breeding and feeding may be due to the resulting greater output per unit of feed, or to an improvement in the quality of the product. The distinction between these two types of improvements is highly significant. Progressive farmers will tend to adopt that practice which reduces production costs. On the other hand, a change in technique which improves the quality of product without affecting physical input-output ratios is likely to make little appeal to producers unless they receive a higher price for the superior product. Under existing market conditions butcher hogs are sold in the United States by live weight with little or no sorting or pricing on the basis of quality,[6] except for gilts advanced in pregnancy and hogs with obvious defects. In other words, that part of the work of the animal geneticist or nutritionist, which leads to an improvement in the relative proportions or quality of high value pork cuts, will have little practical significance unless and until consumer preference is reflected in a differential price to producers.

Indications are that quality is given more consideration in the pricing of other species of slaughter animals than is the case with hogs. Nevertheless, there is considerable disparity between prices paid for individual animals or lots of animals and actual values. In the case of an individual slaughterer, this disparity probably disap-

[6] *The National Provisioner*, July 3, 1948, p. 57.

pears with the purchase of large numbers of animals, but the individual farmer is concerned with the actual value of his particular animal or lot.

Interest in the desirability and practicability of marketing slaughter livestock by carcass weight and grade has developed during recent years. Some pioneering work was carried on at the Iowa Agricultural Experiment Station during 1938 and 1939.[7] In this study it was found that experienced packer buyers were not able to appraise accurately the cut-out value of individual lots of hogs. The Minnesota Agricultural Experiment Station began work with slaughter cattle and butcher hogs in 1946, and the Wisconsin and South Dakota Stations with veal calves and slaughter lambs in 1947. "Marketing Slaughter Livestock by Carcass Weight and Grade" was adopted as a regional project by the North Central Livestock Marketing Research Committee in March 1947. The over-all project included four sub-projects covering (1) cattle, (2) veal calves, (3) hogs, and (4) sheep and lambs. Grants from R. M. A. funds were made to the cooperating states in the fall of 1947 and additional funds from this source have been made available for fiscal 1949.

Seven state agricultural experiment stations are now at work on one or more of these sub-projects. These states include: Iowa, Kansas, Michigan, Minnesota, Ohio, South Dakota, and Wisconsin. Four other corn-belt states expect to begin work on various sub-projects during the current fiscal year. These include: Indiana, Kentucky, Missouri, and North Dakota. The Departments of Agricultural Economics and Animal Husbandry at the various state experiment stations are cooperating on this project at the state level. Three bureaus of the United States Department of Agriculture are cooperating with the state experiment stations. These include the Bureau of Agricultural Economics, the Production and Marketing Administration, and the Bureau of Animal Industry.[8] Packing plants in the various states of the region are cooperating by making

[7] Shepherd, Geoffrey, Fred J. Beard, and Arval Erikson, *Could Hogs Be Sold by Carcass Weight and Grade in the United States?* Iowa Agricultural Expt. Sta., Res. Bull. 220, pp. 462–471, January 1940.

[8] The B.A.E. has employed a Cooperative Agent, with headquarters at University Farm, St. Paul, Minnesota, to assist the state workers with the collection, tabulation, and analysis of data. The P.M.A. has assumed responsibility for grading all carcasses and wholesale cuts. Graders located near the slaughtering plants where work is in progress will be assigned to this work. The B.A.I. will assist with the measuring and will supervise the cutting of hog carcasses in plants where this work is in progress. Each of these U.S.D.A. bureaus has designated a staff member to consult and advise with the regional Technical and Executive Committees.

their facilities and personnel available for the collection of primary data.

The approach to the problem of marketing slaughter livestock, by carcass weight and grade is not the same for all species.[9] Beef, veal, and sheep and lamb carcasses are sold in the wholesale trade, and prices are quoted on the basis of the established official U. S. Grades. In purchasing these species on the live weight basis, buyers attempt to arrive at actual value by estimating the carcass grade and dressing yield. Consequently, one approach to the problem for these animals is to determine the departure of these estimates from the actual yields and carcass grades and to determine the economic significance of these errors of estimate. On the other hand, hog carcasses are not sold as carcasses, but in the form of wholesale cuts and trimmings. No official government standards have been established for carcasses of this species. Consequently, the first step is to establish objective carcass standards which have economic significance. It will then be possible to measure the relative accuracy of the live buying method and the carcass weight and grade method.

This paper will be confined to slaughter cattle and hogs since the work at Minnesota has been limited to these species. The results of these studies should be considered as being tentative or suggestive rather than conclusive. The work was done at a single slaughtering plant, and data are based upon a relatively small number of animals and carcasses.

Slaughter Cattle Studies[10]

Data were obtained on 400 head of slaughter cattle of which 209 were steers, 76 heifers, and 105, cows, at the Geo. A. Hormel & Co. plant, Austin, Minnesota. The same packer buyer estimated the dressed yield to the nearest one-half percent, and the carcass grade on the basis of the upper one-third, middle one-third, and lower one-third of each official grade, for each animal separately.[11] The car-

[9] Gerald Engelman, "Carcass Grade and Weight Studies in Marketing Livestock," This JOURNAL, November, 1947, pp. 1424–8.

[10] Professors E. F. Ferrin and P. A. Anderson, Division of Animal Husbandry, University of Minnesota, cooperated on these studies. Fred J. Beard and Charles E. Murphey, Standardization and Grading Division, Livestock Branch, P.M.A., and Knute Bjorka, Bureau of Agricultural Economics, rendered invaluable assistance.

[11] It is recognized that there is some variation in the ability of buyers to estimate the dressing yields and carcass grades of slaughter cattle. The buyer who made these estimates had many years experience and was accustomed to the frequent checking of his estimates against the actual yields and carcass grades of the animals.

casses were graded by one official government grader on the basis of the upper, middle, and lower one-third of each official government grade.[12]

The divergence between estimated and actual yields was greater for individual cows than for individual steers and heifers,[13] and greater for individual steers and heifers than for lots of steers and heifers. The standard deviation was 2.96 percent for individual cows, 1.65 percent for individual steers and heifers, and 0.83 percent for lots of steers and heifers.[14] This reduction in the standard deviation for lots compared with individual steers and heifers indicates that errors[15] in estimating yields of individual animals in a given lot tend to cancel each other out to a certain extent.

About 74 percent of the estimates for individual cows would be expected to fall more than 1.0 percent above or below actual yields compared with 54 percent for individual steers and heifers, and 33 percent for lots of steers and heifers. Nearly 50 percent of the estimates for individual cows would be expected to fall more than 2.0 percent above or below actual yields, compared with 22 percent for individual steers and heifers and only 2 percent for lots.

The divergence between the estimate of carcass grade and actual grade was greater for individual cows than for individual steers and heifers, and greater for individual steers and heifers than for lots of steers and heifers. The standard deviation between the estimated and actual grades was about one-half of a full grade for cows, a little more than one-third of a full grade for steers and heifers, and about one-fourth[16] of a full grade for lots of steers and heifers.[17]

Farmers who sell cattle by lots are concerned with a smaller error per hundredweight than farmers who sell animals singly or

[12] No effort was made in this study to determine possible variations in the work of the different carcass graders.

[13] The difference between the variance for steers alone and that for heifers alone did not approach statistical significance at the 10 percent fiducial limit. Therefore these classes were combined.

[14] The respective probable errors were 2.00, 1.11, and .56.

[15] In this paper, the term "error" is used to indicate divergence between estimated and actual yields, and live and carcass grades.

[16] There is no exact measure of the reduction in the error of estimating carcass grades for lots of slaughter steers and heifers compared with the error for individual animals for the simple reason that an average grade for a mixed lot of animals cannot be precisely determined. However, it is possible to approximate the reduction in the error of estimate. The method used involves ascribing arbitrary weights to the different carcasses according to grade.

[17] The standard deviation was .49 of a full grade for cows, .37 for individual steers and heifers, and .25 for lots of steers and heifers. The respective probable errors were .33, .25, and .17

in small groups, but the small grade errors for lots probably are much more important in terms of the total value error than the large errors for individuals. Here again, individual errors within lots tend to cancel each other out to some extent. About one-fourth of the estimated grades of individual cows would be expected to be placed in the same one-third of a full grade by the official grader, compared with one-third for individual steers and heifers and one-half for lots of steers and heifers.

A majority of the cattle were purchased on the carcass weight and grade basis, and, hence, a liveweight price was not negotiated on the animals. For that reason, liveweight prices per hundredweight were estimated on the basis of the buyer's estimate of carcass yield and grade, while the actual value was calculated on the basis of the actual yield and the official grade.[18]

The carcass prices used in these calculations for steer and heifer carcasses are based upon the unweighted average wholesale price of good grade beef steer carcasses at Chicago during 1947, with price differentials between the various official grades adjusted on the basis of the differentials which prevailed during the 5-year period 1937–41.[19] The price for the middle one-third of each full grade was the average price for the full grade. Prices for the high one-third and low one-third grades were adjusted by one-third of the spread between the full grades. The same method was followed in arriving at the level of cow carcass prices.

The total price error per 100 pounds liveweight and the part of the total error due to error in estimating yield and the part due to error in estimating grade are shown for each of the 20 animals in one sample lot in table 1. The range in total price errors per 100 pounds of liveweight was from −$1.82 for one animal to +$2.31 for another. On the basis of a 1000 pound steer, one steer was valued $18.20 too low and the other $23.10 too high. In some cases

[18] It is apparent that estimated prices per 100 pounds liveweight, based entirely upon carcass prices or values, are not the exact prices that would have been offered by the buyer because by-product credits and operating costs are ignored. If these items had been included in the calculations, the result would have been to shift both the estimated prices and the actual values per 100 pounds liveweight in the same direction and to about the same extent.

[19] It was believed that price differentials between the different grades of beef carcasses were more representative of long time price relationships from 1937–41 than during and immediately following the period of price controls when this study was under way.

a price error in one direction due to the error in estimating yield was compensated in part by a price error in the opposite direction due to an error in estimating grade, but more often the two errors tended to be in the same direction.[20] The tendency for the total price error between individual steers to cancel out to a certain extent

TABLE 1. DIFFERENCE BETWEEN ESTIMATED PRICE AND ACTUAL VALUE PER 100 POUNDS LIVEWEIGHT OF INDIVIDUAL ANIMALS IN A SAMPLE LOT OF SLAUGHTER STEERS*

Steer Number	Estimated Price per 100 lbs. Liveweight	Actual Value per 100 Lbs. liveweight	Price Error per 100 Pounds Liveweight		
			Total Price Error	Part of Total Due to Error in Estimating	
				Yield	Grade
1	$23.83	$22.54	$+1.29	$+1.29	$ .00
2	24.03	22.15	+1.88	+1.03	+ .85
3	22.36	22.51	− .15	+ .67	− .82
4	23.85	23.44	+ .41	+ .41	.00
5	22.36	24.18	−1.82	− .20	−1.62
6	22.56	22.38	+ .18	+ .18	.00
7	23.62	23.90	− .28	− .28	.00
8	23.82	22.43	+1.39	+ .54	+ .85
9	24.06	23.93	+ .13	+ .13	.00
10	24.06	24.39	− .33	− .33	.00
11	22.15	22.74	− .59	+ .95	−1.54
12	23.82	21.51	+2.31	+ .62	+1.69
13	23.62	23.62	.00	.00	.00
14	23.41	22.82	+ .59	− .28	+ .87
15	23.62	22.59	+1.03	+1.03	.00
16	22.36	23.88	−1.52	− .64	− .88
17	24.05	22.92	+1.13	+ .26	+ .87
18	24.26	24.16	+ .10	+ .10	.00
19	23.82	22.38	+1.44	+ .59	+ .85
20	24.05	23.77	+ .28	− .62	+ .90
Lot Average	23.49	23.10	+ .39	+ .26	+ .13

* This lot appears as lot 5 in table 2.

is indicated by an average price error for the lot of +$.39 per 100 pounds liveweight.

As would be expected from the physical data, the divergence between estimated price and actual value was less for steers and

[20] About 49 percent of the total price error for individual steers and heifers was due to errors in estimating grade, 27 percent to errors in estimating yield, and 24 percent to the interaction of the two factors. The basic equation for this determination was: $\sigma_T^2=\sigma_y^2+\sigma_g^2+2\gamma_{yg}\sigma_y\sigma_g$ where, σ_T^2 = total variance; σ_y^2 = variance due to yield error, and σ_g^2 = variance due to grade error.

heifers by lots than for individual animals. The standard deviation of total price error per 100 pounds liveweight was 1.33 for individual steers and heifers, and .79 for steers and heifers by lots. Here also, there was a tendency for price errors between lots to cancel each other out to some extent (table 2). The range in total price errors per 100 pounds liveweight for the different lots was from −$.95 to

TABLE 2. DIFFERENCE BETWEEN ESTIMATED PRICE AND ACTUAL VALUE PER 100 POUNDS LIVEWEIGHT OF SLAUGHTER STEERS AND HEIFERS BY LOTS*

Lot Number	Number of Head	Estimated Price per 100 lbs. Liveweight	Actual Value per 100 Lbs. Liveweight	Price Error per 100 Pounds Liveweight		
				Total Price Error	Part of Total Due to Error in Estimating	
					Yield	Grade
1	15	$23.13	$22.23	$+ .90	$+.15	$+ .75
2	10	25.55	25.16	+ .39	−.38	+ .77
3	15	26.68	26.40	+ .28	+.15	+ .13
4	15	24.93	24.72	+ .21	+.34	− .13
5	20	23.49	23.10	+ .39	+.26	+ .13
6	19	25.73	24.44	+1.29	+.46	+ .83
7	16	28.58	27.94	+ .64	−.08	+ .72
8	15	27.78	27.04	+ .74	−.08	+ .82
9	6	22.51	23.28	− .77	−.13	− .64
10	17	23.88	23.95	− .08	−.21	+ .13
11	11	22.46	22.13	+ .33	+.31	+ .02
12	10	23.39	23.52	− .13	−.23	+ .10
13	14	21.84	21.87	− .03	+.15	− .18
14	13	28.76	27.22	+1.54	+.15	+1.39
15	13	28.68	27.54	+1.14	+.57	+ .57
16	11	26.19	25.03	+1.16	+.54	+ .62
17	13	24.85	25.80	− .95	−.80	− .15
18	18	21.59	22.46	− .87	−.61	− .26

* The lots are arranged in the order in which they were purchased and slaughtered.

+$1.54. On the basis of 20–1000 pound animals per lot, this would represent an underestimate of $190 for one lot, and an overestimate of $308 for the other.

The probability of agreement between estimated price and actual value per 100 pounds lightweight for individual cows, individual steers and heifers, and lots of steers and heifers is shown in table 3. The actual value of about 40 percent of the cows would be $1.00 per 100 pounds liveweight or more above or below the estimated price, compared with about 45 percent of the individual steers and heifers,

and 20 percent of the lots of steers and heifers.[21] Similarly, the actual value of about 9 percent of the cows would be $2.00 per 100 pounds liveweight or more above or below the estimated price, compared with about 13 percent of the individual steers and heifers and about 1 percent of the lots of steers and heifers.

The reduction in estimates of physical yield and grade errors,

TABLE 3. PROBABILITY OF AGREEMENT BETWEEN ESTIMATED PRICE AND ACTUAL VALUE PER 100 POUNDS LIVEWEIGHT OF SLAUGHTER CATTLE, 1947 PRICES*

Price Error per 100 Lbs. Liveweight (actual ± estimated)	Individual Animals		Lots
	105 cows	251 steers and heifers	18 lots of steers and heifers
	(percent)	(percent)	(percent)
$ .25	16.8	14.9	24.9
.50	32.9	29.3	47.4
.75	47.6	42.7	65.8
1.00	60.5	54.8	79.5
1.25	71.2	65.2	88.7
1.50	79.8	74.2	94.3
1.75	86.3	81.1	97.3
2.00	91.1	86.8	98.9
2.25	94.4	90.9	99.6
2.50	96.6	94.0	—
2.75	98.1	96.1	—
3.00	98.9	97.6	—
3.25	99.5	98.5	—
3.50	—	99.1	—

* For explanation see text.

and, hence, in price errors for lots compared with individual animals is highly significant. It suggests that for all slaughterers combined, or even for a given large slaughterer, about the same amount of money probably is paid for all cattle purchased under the present liveweight method as would be paid under the carcass weight and grade method. However, the money would be distributed differently among the different sellers. Under the carcass method, the returns would be distributed more nearly in accordance with the actual value of the product delivered. Furthermore, many animals are not sold in lots but as individual cows, bulls, or steers and heifers or in small groups of 2 or 3 head at a time.[22]

[21] The standard deviation of price errors was 1.18 for cows compared with 1.33 for individual steers and heifers.

[22] Corn Belt Livestock Marketing Research Committee, *Marketing Livestock in the Corn Belt Region*. Bulletin 365, South Dakota Agricultural Experiment Station, November 1942, tables 44 and 45.

Slaughter Hog Studies

The basic data for the hog carcass phase of the study also were obtained at the Geo. A. Hormel & Co. plant at Austin, Minnesota. A total of 695 carcasses were selected, varying in weight from 115 pounds to 215 pounds, which would approximate the liveweight range of from 180 to 300 pounds. The entire 100 pound range was divided into 10 consecutive weight groups and an effort was made to obtain, within each 10-pound weight group, carcasses ranging in finish from very fat to very lean.

Detailed carcass measurements were taken in the coolers. The carcasses were cut by personnel selected from the regular cutting crew in the plant according to standardized cutting procedures.[23] The various cuts and trimmings were weighed to determine the contribution of each to the total weight of the carcass. The analysis is concerned with the possibility of developing objective grade standards for hog carcasses on the basis of one or more of these measurements.

Examination of scatter diagrams showing the relationship of the different carcass measurements to various combinations of high value cuts indicated pronounced and consistent superiority of average backfat thickness to the other measurements. Length of body appeared to rank second, but considerably below backfat, and the other measurements were below body length, with belly pocket thickness at the bottom of the list.

The average correlation of backfat to the percent of four lean cuts (hams, loins, butts and picnics) plus lean trimmings and belly which we have termed the index of lean,[24] for the entire sample was $-.8589$, and the corresponding coefficient of determination was .7377. Since backfat thickness explains 74 percent of the variability in the index of lean, it seemed doubtful whether much improvement in correlation could be expected from the addition of other variables. However, since the scatter diagrams indicated that length was the second most promising measure, multiple correlation analyses, using backfat and body length as the two independent varia-

[23] The cutting operations followed in this plant were observed by representatives of the Standardization and Grading Division, Livestock Branch, PMA, and a standardized cutting procedure prepared.

[24] As used in this paper, the index of lean, consequently, refers to the percentage of the entire carcass which is made up of the four lean cut (hams, loins, butts, and picnics) plus lean trimmings and belly.

bles, were calculated separately within each of the 10 weight groups. There was relatively little improvement in the $R_{1.23}$ over the r_{12} for backfat alone. The relatively small improvement is explained largely by the high degree of intercorrelation between average backfat thickness and body length. This means that, for the same weight of carcass, if backfat is decreased, length will tend to be increased, and the index of lean will be increased correspondingly.

The index of lean is a quantitative, objective measure of degree of finish. Instead of being described as very fat, moderately fat, lean, etc., carcasses may be classified by measurable indices of lean, such as 66.0, 68.0, 70.0, etc. An index of 70 means that the four lean cuts plus lean trimmings and bellies constitute 70 percent of the weight of the carcass. The problem is to provide means for evaluating hog carcasses according to their expected indices of lean before they have been disassembled on the cutting floor.

The first step was to compare carcasses having the same index of lean, but differing in carcass weight. This was done to develop the expected relationship of backfat thickness to carcass weight at a given index of lean. Within each 10-pound weight group the expected backfat thickness, when the index of lean was equal to 70.0, was computed. This revealed a slight curviliniar tendency; for a given index of lean, backfat thickness increases with an increase in carcass weight but at a decreasing rate. The logarithmic equation $\log Y = a + b \log X$[25] was used to describe this change in backfat thickness associated with changes in carcass weight when the index of lean is held constant.[26]

The next step was to develop the expected rate of change or regression relationship of backfat thickness to the index of lean at any given carcass weight. However, this relationship itself changes with carcass weight. A change in the computed backfat thickness of standardized carcasses, expected with changes in carcass weight (as indicated in the preceding paragraph) is associated with a proportionate and opposite change in the regression coefficient of back-

[25] As calculated, the expression reads:
$\log Y = 1.0415302 - 0.263{,}574{,}408 \log X$,
where Y = expected backfat thickness when the index of lean is equal to 70.0 and X = carcass weight.

[26] The potential curve $Y = a + bX + cX^2$ and the semi-logarithmic exponential equation $\log Y = a + bX$ were quite satisfactory for the weight of carcasses used in this study, that is from 115 to 215 pounds, but not for projection beyond these extremes.

TABLE 4. SUGGESTED HOG CARCASS GRADE STANDARD BASED ON BACKFAT THICKNESS AND CARCASS WEIGHT

Carcass Weights	Equiv. Live Wt. (approx.)	Carcass Grades											
		8		9		10		11		12			
		Backfat Thickness at Margin	Average Index of Lean	Backfat Thickness at Margin	Average Index of Lean	Backfat Thickness at Margin	Average Index of Lean	Backfat Thickness at Margin	Average Index of Lean	Backfat Thickness at Margin	Average Index of Lean	Backfat Thickness at Margin	
(lbs.)	(lbs.)	(in.)	(per-cent)	(in.)	(per-cent)	(in.)	(per-cent)	(in.)	(per-cnet)	(in.)	(per-cent)	(in.)	
110–140	165–205	2.3	64.1	2.0	67.0	1.7	70.0	1.4	72.9	1.1	75.8	0.8	
140–180	205–260	2.5	64.1	2.1	67.3	1.8	70.0	1.5	72.7	1.2	75.5	0.9	
180–220	260–310	2.6	64.4	2.2	67.4	1.9	70.0	1.6	72.6	1.3	75.6	0.9	
220–270	310–375	2.7	64.2	2.4	67.1	2.0	70.0	1.7	72.8	1.3	75.7	1.0	

fat to the index of lean. The curve which expresses this inversely proportionate relationship is the rectangular hyperbola and the equation which describes this curve is $y=1/x \cdot c$.[27]

Through the use of these equations it was possible to develop a table showing the expected indices of lean for all weights of carcasses, and for all variations of backfat thickness within the various carcass weight groups.[28] It is obvious that such a schedule could not be used to classify or grade hog carcasses in a packing plant due to the minute gradations in backfat thickness between carcasess within a given weight group, and between carcasses in different weight groups. The problem at this point is to combine carcass weights and backfat thicknesses in such a way as to provide a hog carcass standard that is practical and at the same time one that has economic significance. An attempt was made to keep the average index of lean comparable within each grade regardless of weight, and to have the mid-point of one grade separated from the mid-point of the next grade in each of the weight groups by a difference of 3.0 for the index of lean and 0.3 inch for backfat thickness in so far as this was possible (table 4). It is believed that carcasses can be grade on the basis of a difference of 0.3 inch average backfat per grade under usual packing house conditions.

Carcasses in grade 8 would be very fat, and those in grade 12 would be very lean. Carcasses increase in value per 100 pounds with increase in the index of lean up to the point where certain cuts are discounted for lacking quality, or up to the point where the cuts are discounted due to excess weight. Under long-time price relationships, carcasses in grade 10 probably command the highest price.

After developing analytical procedures to predict the combined percentage of hams, loins, picnics, butts, bellies, and lean trimmings in a given carcass on the basis of backfat thickness and carcass weight, the next step was to determine the individual percentages of each separate cut and trim. Each of the components of the hog carcass varies with the index of lean. These relationships were determined by computing the regression of each separate component to the index of lean.

[27] Where y = expected regression coefficient,
x = computed backfat thickness,
and c = a constant.

[28] This table would define a curvilinear surface comparable to the regression surface of a three variable multiple correlation problem.

The location and slope of the regression line for each of the 14 wholesale cuts, trimmings, and skeletal parts to the index of lean were determined as indicated in figure 1. With these two values the average percentage of a given cut or part at any particular index of lean can readily be determined.

With both the index of lean and schedule of prices for each of the component cuts and parts known, the value of the average carcass can be readily determined. The several percentage components of the carcass are simply multiplied by their respective prices, and the sum of these value products will give the carcass value per 100 pounds regardless of carcass weight. The value of a given carcass is obtained by multiplying this sum by the weight of the carcass.

An additional problem in pricing arises, due to the variability in the weight of certain cuts within a given weight and grade of carcass. Hams, loins, picnics, and bellies are priced in the wholesale trade according to weight. There is a variability of the weight of a given cut around its regression line (figure 1) to the index of lean, and, within a given grade there is a variability of the index of lean around the average index for the grade. These two variabilities were taken into account to get at the dispersion of weights of a given cut within any given grade and weight group,[29] and thereby to determine the proper pricing of these several cuts in building up the composite value of the entire carcass.

Values of certain weights and grades of carcasses are shown in table 5. The prices used in computing these values are based upon the average price relationship for the several component cuts and trimmings to each other during 1937–41, and the average liveweight price per hundredweight paid by packers ($24.60) for all slaughter hogs bought in 1947.

Several important tendencies are apparent in the data shown in this table. Within any given weight range, grade 8 carcasses have a lower value than grade 10 carcasses because they yield less of the high value cuts. Another important tendency is the apparent changing relationship of degree of finish with carcass value at different carcass weights. This is because within each weight group the

[29] The variance of the index of lean within grades, deflated by the regression coefficient of the particular cut to the index, was added to the variance of this cut around its regression line to obtain the variance of the weight of the cut within a given weight and grade of carcass

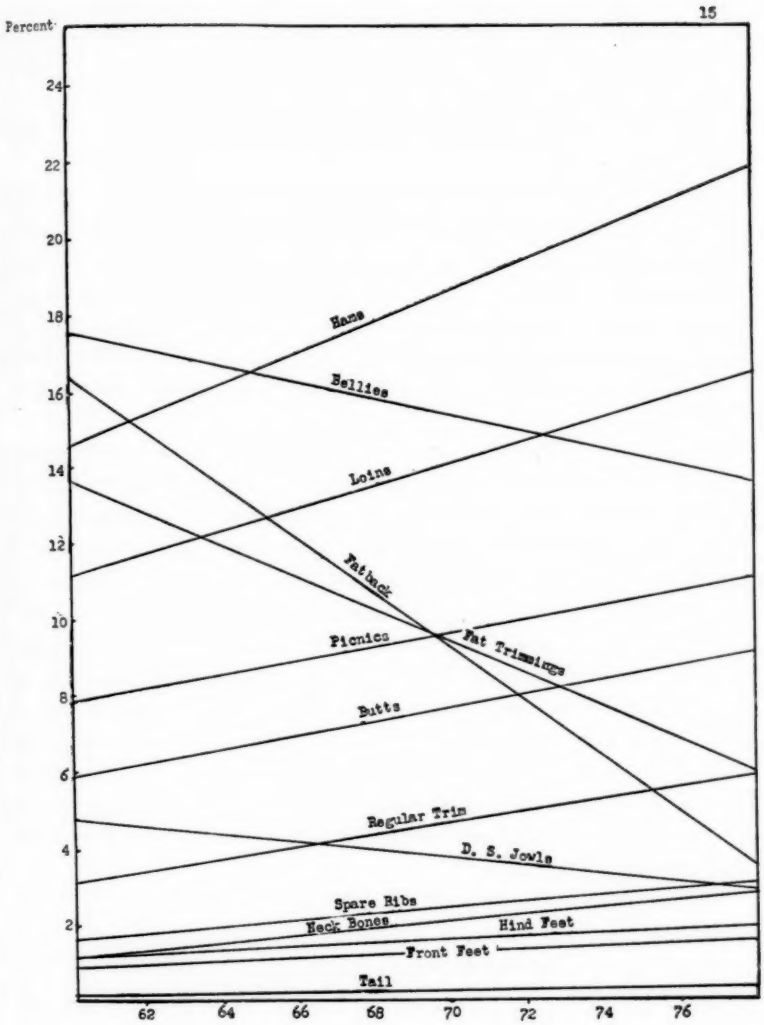

FIG. 1. PERCENTAGE RELATIONSHIP OF THE VARIOUS WHOLESALE CUTS AND TRIMMINGS TO THE INDEX OF LEAN.

weights of hams, loins, and picnics decline with the decline in index of lean, and when the reduced weight of a particular cut places it in a higher price bracket, which is more common with the heavy than with the light weight carcasses, this offsets part of the decrease in

value of the carcass which is due to the higher proportion of lard. Still another important tendency is the decline in value associated with increasing carcass weight within the same grades. Furthermore, the decline appears to take place at an increasing rate, although the rate of decline is probably at a maximum in the 180-220 pound groups.

The particular weight groups shown in table 4 are a grading device, a part of the grading technique, and were established to obtain the optimum classification of carcasses according to physical homogeneity. The economic homogeneity within the grade and weight groups shown in table 4 would be improved by a more refined weight classification such as that suggested in table 5. These refinements could be made within the weight groups required by the grade standard.

One of the primary reasons for conducting these investigations was to compare the relative accuracy of the liveweight and the carcass weight and grade marketing methods in pricing butcher hogs. The suggested carcass grade standards were developed to aid in this analysis. Information for this analysis was obtained on 40 lots of hogs, 5 to a lot, or a total of 200 individual animals, during the first two weeks of October 1947. The live hogs were priced on the basis of average prices for the respective weights for this two week period. Carcasses were graded according to the previously developed standard. Carcass values for the different grades were computed on the basis of prices of wholesale cuts and trimmings. The average carcass value was adjusted to equate with the average live price paid, $28.39 per hundredweight, both for the 40 lots and the 200 individual animals.

The analytical procedures used to measure relative pricing accuracy depended primarily upon a comparison of variances at the several stages of the marketing process under the different methods. The three value variances pertinent to this analysis are (1) the variance of individual animal values about their mean, (2) the variance of values about liveweight prices paid for lots, and (3) the variance of values about prices which would have been paid under the carcass weight and grade method. The difference between the first and second comprises the reduction in variance accomplished by the present liveweight method. The difference between the first and third comprises the reduction in variance attributed to a possible carcass weight and grade method. These reductions in

variance attributed to the live and carcass methods respectively are measures of the relative accuracy of pricing of the two methods. The third or final variance is the residual variance due to the variations in value within carcass grades. It is a measure of the errors in pricing which would remain after carcass buying.

TABLE 5. COMPOSITE CARCASS VALUES FOR SPECIFIED CARCASS GRADES*

Carcass Weight	Equivalent Liveweight (approximate)	Carcass Grades				
		8	9	10	11†	12†
(pounds)	(pounds)					
110–140	165–205					
110–120		$39.80	$40.69	$41.49	—	—
120–130		39.85	40.65	41.44	—	—
130–140		39.82	40.55	41.24	—	—
Average		39.82	40.63	41.39	—	—
140–180	205–260					
140–150		39.37	40.19	40.83	—	—
150–160		39.26	40.00	40.60	—	—
Average		39.31	40.09	40.71	—	—
160–170		39.18	39.72	40.23	—	—
170–180		38.90	39.44	39.82	—	—
Average		39.04	39.58	40.02	—	—
180–220	260–310					
180–190		38.53	38.90	39.29	—	—
190–200		38.28	38.63	38.91	—	—
Average		38.41	38.76	39.10	—	—
200–210		38.03	38.29	38.49	—	—
210–220		37.79	37.97	38.10	—	—
Average		37.91	38.13	38.29	—	—

* These prices are based upon the average price relationship for the several component cuts and trimmings to each other during 1937–41, and the average liveweight price paid by packers ($24.60) for all slaughter hogs bought in 1947.

† Prices were not calculated for these grades because insufficient data were available to determine accurately the expected frequency of discounted cuts.

These variances were computed and the total variance was distributed according to its constituent elements as shown in the table at the top of the next page.

The percentage figures indicate that live buying removes 45 percent of the value variance while carcass buying would remove 82.9 percent (45.0+37.9). These two reductions constitute a

	Variance of Values	Percentage of Total Variance
Total variance of individual animal values	.6319*	100.0%
Reduction attributed to live buying	.2842	45.0%
Further reduction from live buying to carcass buying	.2395	37.9%
Residual variance remaining after carcass buying (within grades)	.1082	17.1%

* It should perhaps be emphasized that this estimate of total variance is not an estimate representative for the entire population. This particular section of the analysis was confined to spring farrowed butcher hogs, all within a fairly narrow weight range, arriving at one packing plant from a local trade area, and marketed during one two-week period. Because sampling was random, it was an adequate sample for hogs satisfying the above conditions. The purpose of this analysis, however, was not to determine the total variance of hog values but rather to compare pricing accuracy of different marketing methods, and it is believed to be satisfactory for the latter.

comparison of the accuracy of the two methods. Viewed from another direction, under the live buying method 55 percent of the total variance remains after purchase in the form of a distribution of actual values about live prices paid, while under the carcass method only 17.1 percent of the total value variance would remain after purchase in a similar distribution of values about carcass prices paid.

Because hogs are purchased on the liveweight basis today, any reduction in variance up to this point is of academic importance only. If the variance of values about live prices paid is used as the base, then 68.9 percent of this remaining value variability would be removed through the marketing of hogs on the carcass weight and grade basis.

Conclusions

On the basis of these preliminary studies, it appears that considerable improvement in the accuracy of grading and pricing slaughter cattle and hogs might be brought about through the adoption of the carcass weight and grade method of marketing. Pricing errors due to errors in estimating yield would be eliminated, while those due to errors in estimating carcass grade would be reduced. This would permit more accurate reflection of consumer preferences back to livestock producers and hence tend to bring about more effective allocation of productive resources on the farm. Other apparent advantages would include greater efficiency in the move-

ment of livestock to the place of slaughter, and elimination of unnecessary "fill".

It is important that the practicability of the carcass weight and grade method of marketing, under conditions which prevail in the United States, be thoroughly explored. These include, among others, the identification, weighing, and grading of the carcasses, handling condemnations, making settlement to owners of the animals, and the relative cost of marketing under the carcass weight and grade and the liveweight methods.

It seems probable that this will prove to be one of the most fruitful fields to be explored by those who are interested in bringing about the more effective marketing of slaughter livestock and meats.

DISCUSSION*

GEORGE M. LEWIS
American Meat Institute

As Dr. Dowell points out, a number of the agricultural college people in several of the states have become interested in this subject and are planning also to initiate some research work in this field. An Institute committee, consisting of representatives of a number of meat packing companies, has had the pleasure on a number of occasions in recent years of meeting with members of the North Central Livestock Marketing Research Committee and of discussing this problem with them. We have emphasized with these gentlemen that, in our opinion, there are two basic steps to take in the approach to this type of research. First of all, sound, practical, and objective grade standards must be developed which will represent the value of each type of animal carcass, and second, if and when such a set of satisfactory standards has been developed, it will then be appropriate to make a comparison of this method of value determination with the existing system of marketing livestock to find out which is better, all things considered.

I wish to offer the following comments on some of Dr. Dowell's preliminary and tentative findings.

Comments on the Cattle Study

Estimating yields: In the attempt to estimate the dressing yield of the cattle included in the study, it would seem that the procedure was somewhat contrary to the usual industry practice. One individual did all of the estimating of the yields. These animals included a mixture of steers, heifers and cows. The usual practice in the industry generally is for a buyer to concentrate on one class of cattle. Generally speaking, most cattle buyers have been trained to make their appraisals of yields of cattle on the basis of an entire lot of animals rather than on the basis of individual

* A discussion presented at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

animals. Only a very small portion of the cattle is offered for sale on an individual head basis. A typical buyer's performance, therefore, naturally would be expected to be better on a lot of cattle than on individual animals, not only because of the difficulty involved but also because of the training and experience. There is a continual effort to make comparison through training and experience.

Estimating grades: In attempting to estimate the grades of beef, there are some significant points to consider. One government grader graded all of the carcasses. This provided no check on possible errors of judgment, and there frequently is just as much difference of opinion, among the experts, in the grading of beef carcasses as there is in the grading of livestock. Furthermore, the inadequacy of the present government grading system, for the purpose of value determination, was recognized, since the carcasses were classified on the basis of upper, middle and lower one-thirds of each official government grade. It apparently was assumed that government grades—or at least when divided into thirds—reflect carcass values. In our opinion, this assumption is not valid. We do not believe present government grades and grading adequately represent market values of beef. These grades were not developed for this purpose. Experience under OPA demonstrated very forcefully the shortcomings of government grades, both from the standpoint of consistent determination and their proper reflection of beef values.

It is important to keep in mind that there are many factors that determine beef values, such as the nature and location of the market outlets, weights of the carcasses and cuts, kind of feed which the animals have been fed, etc. For example, the United States Department of Agriculture yesterday quoted U. S. Commercial grade steer and heifer beef at Chicago from $44.00 to $52.00 per cwt. dressed. The reason for this extremely wide price range is that there existed a variable demand for the wide variety of beef classified under this particular grade of beef.

Therefore, it would seem that the basic problems in this type of research study on cattle are:

First, find out whether different graders consistently can grade beef according to the existing official government grades not only for the full grade, but more particularly for thirds of grades, or for some other division of each of the government grades. If this can't be done accurately and consistently, then endeavor to develop adequate objective standards which will assure that an adequate grading job can be done; and

Second, try to determine objectively whether present government grades or divisions thereof, do or do not (as I have contended) reflect accurately the value of beef. If they do not, then grades must be developed which will, and in this connection we believe that it will be found that Government market quotations, based on one or two markets will not measure accurately realization possibilities for the entire country.

Comments on the Hog Study

It is my impression that Dr. Dowell and his associates have made a good start in the development of objective grade standards for hog carcasses. He has found that the thickness of fat back bears a fairly high correlation

to the percent of lean cuts. However, this correlation is not nearly perfect, and fat back thickness for different weight hogs may fall short of being a sufficient basis for evaluating completely and accurately individual hog carcasses. For this and other reasons, I believe the study should show how much variation there is in the percentage of the various cuts within a grade. There seems to be no measure of quality for the different hogs within a given weight range and between individual cuts. The proposed grades would classify hog carcasses only on the basis of finish and weight. Provision should be made for proper discount for the sub-standard products. We believe also that these grades would tend to encourage the production of rangy, inefficient type hogs which would have a high index of lean, but which might not be of the desired conformation, type, and quality. In other words, the thickness of back fat and index of lean does not necessarily measure quality.

Therefore, it would not measure value or result in an inducement to raise the right kind of hogs. We suggest a standard for hog carcasses cannot be measured alone on the basis of the percentage of these lean cuts, etc. Length and other carcass characteristics need to be considered further to measure type and conformation, and objective standards are needed to measure yield and quality of the primal cuts.

In our opinion, any set of objective standards developed should not lose sight of the three fundamental characteristics of a good type hog, which include conformation, type, and quality, as well as finish and weight. Certainly no program should be recommended that would tend to discourage the production of properly finished and good quality hogs. Quality embraces firmness, shape of cuts, marbeling and tenderness.

It must be kept in mind that in the development of standards and measurements there is a broad demand in this country for pork products of all weights of hogs from the very light to the very heavy types. Moreover, it should be remembered too that the farmer is interested in the total dollars received for his hogs rather than merely the calculated value of only certain lean cuts. At times, hogs not having such a high lean content may yield the owner more dollars because of a higher total yield.

For example, table 5 in Dr. Dowell's paper shows considerable difference in the value of carcasses of different grades within a weight range. Actually, on a live basis, a considerable proportion of this difference might be offset by the higher carcass yield of the better finished hogs.

More Practical Problems Involved: Aside from the possible eventual development of adequate objective standards for animal carcasses, there are a number of very complicated problems and difficulties in connection with the proposed type of marketing livestock by carcass weight and grade. Since we should keep these in mind in looking down the road, and before reaching conclusions, I shall mention some of them.

(1) Maintaining identification of animals would be very difficult. No method of marking, including tattooing, has been perfected that will prevent the mixing of animals before final value determinations are made. This would be particularly serious in the case of animals having large bruises or otherwise subject to discount for quality.

(2) Determination of shrinkage allowances for the time involved when

livestock is in transit and is being held for slaughter. Considerable shrinkage goes on from the time the animals are loaded at the farms until they are slaughtered, and the amount of shrinkage will vary also, depending on the distance traveled, the length of time en route, the method of transportation used, temperature, kind of feed fed and the treatment the animals received en route. This problem of shrinkage allowances would be a difficult one, especially on shipments of live hogs from the Midwest to the East and West Coasts.

(3) The handling of condemnations would be particularly troublesome. Under the present system, condemnation losses generally are spread among all purchases. Under the proposed system, condemned animals, presumably, would be identified.

(4) The time lag in payment to the owners on the animals would create many problems, unless there were to be great changes in where and how livestock is sold and slaughtered. Most livestock producers prefer to receive proceeds from the sale of their livestock at the time of delivery of the livestock to the buyer. This is a particularly troublesome problem where livestock is slaughtered at a considerable distance from point of production.

(5) Most livestock producers, as well as buyers, would be reluctant to place completely in the hands of a government grader the value determination of animals.

(6) There would be considerable additional expense involved which would increase the margin between the price received by producers for livestock and the cost of meat to the consumer.

Meat Industry's Position: I hope that raising these questions will not leave the impression that the meat packing industry is opposed to changes or new developments relating to livestock and meat problems. On the contrary, the industry, I am sure, will welcome such changes or developments as are sound and practicable, and are improvements over the existing methods or practices being followed. As a matter of fact, the industry right along had adopted many new developments and improvements, and as a result, its efficiency of operations, as Dr. Dowell generously points out, are well-known to all. These improvements have occurred in the producing, marketing, processing, distributing, and merchandising phases of the livestock and meat industry.

DISCUSSION*

DAVID G. PATERSON
South Dakota State College

Only limited comments on the paper presented by Dowell and Engelman will be made. In addition, a brief discussion of a similar study being made at the South Dakota station with slaughter lambs will be presented.

Dowell and Engelman are to be commended for so clearly differentiating between the two types of economic gains resulting from improved livestock

* A discussion at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

breeding and feeding practices. Those improvements which result in greater output per unit of input (feed and other production factors) reduce costs, and so are quite readily adopted by progressive producers. On the other hand, changes in techniques which improve the quality of product without affecting physical input-output ratios have little sales appeal if that increase in quality is not reflected back in higher returns to the producer. Hogs were used to illustrate this point but it applies almost equally well to cattle, calves, and lambs.

The method used to obtain live buying prices in the Minnesota cattle study gives the best possible picture of the buyer's ability to reflect back to sellers the true value differences of individual shipments. The competitive market level is also an important consideration for many buyers. The price arrived at on the basis of yield and grade estimates and carcass prices, plus standard by-products credits less standard operating costs, might be $32.00 per cwt. for a particular lot of steers. However the actual purchase price might be above or below this figure depending upon the need for cattle and the buyer's ability to "get the job done." In further studies it would be desirable to obtain the prices actually paid for the animals under as nearly normal operating conditions as possible.

In the South Dakota study with lambs the approach to the problem was very similar to that used in the cattle study at Minnesota. We accepted prevailing federal carcass standards (temporarily at least) and proceeded to determine the departure of estimated from actual yields and grades and to measure the economic significance of these errors.

Data on 32 lots comprising 487 lambs have been collected. As the study is yet to be completed, the following results are preliminary and tentative.

Analysis of the grading results reveals a definite tendency for the buyer to underestimate grades of choice lambs and to overestimate the grades of commercial, utility and cull lambs. Part of this bias is inherent in the data because there is not equal probability of over and under estimating grades of top and bottom lambs. For top choice lambs there is only one higher grade; similarly for cull lambs. The buyer can only overestimate the grade because there is no lower grade. However, the buyer tended toward an "average" or "middle" grade to a greater degree than can be explained by the bias alone.

The buyer did a better job of estimating grades for top lambs than for low grading lambs. The percentages of lambs in each grade (on the basis of the federal grading) for which the buyer's estimate was within one-third grade were: Choice—78%, Good—50%, Commercial—38%, Utility—24% and Cull—43%. During the period of this study the errors in grade estimates for lower grading lambs were of greater economic importance than errors in grade estimates for top lambs. For example, the carcass price differential between good and choice lambs averaged about $1.00 per cwt. while the carcass price differential between good and commercial lambs averaged about $2.50 per cwt.

The buyer's estimate of the average yield for each test lot was obtained. The buyer's estimates of dressing yield for individual lambs were obtained for only three lots comprising 45 lambs because it was decided that this

was an impractical approach for this species. The lots used in this study comprised 10 to 20 lambs. Seldom are lambs marketed in smaller lots than used in the study.

On the 45 lambs for which individual yield estimates were obtained, the buyer did a relatively poor job, as on 35% of the lambs he was off in his yield estimates by more than 3%. For a number of lots there was considerable difference between estimated and actual average yield. The differences ranged from an overestimate of 3.6% to an underestimate of 4.0%. The standard deviation of lot yield differences was 2.1% and the mean deviation was 1.6%.

The differences between estimated and actual yields were greater for those lots having rather extreme yields. For example, the mean deviation of yield differences for 14 lots with actual yields below 46% or above 50% was 1.9%, whereas for 15 lots with actual yields between 46% and 50% the mean deviation was 1.4%. In making yield estimates there was a definite tendency for the buyer to keep nearer the average or normal yield for a large number of lambs than actual results would justify.

When the buyer overestimated grade, there was a tendency for him to also overestimate yield, and vice versa. The correlation coefficient between grade and yield error (r) was +.49 which is just significant at the 1% level. Grade and yield errors were compounded.

The error between actual value and prices paid to individual shippers is greater than the physical errors in grade and yield estimates alone indicate. This is due to the discrepancies between prices actually paid under regular buying procedures and prices that yield and grade estimates for the lot would indicate. A "theoretical" purchase price was calculated for each of the three lots for which individual yield estimates were obtained. The "theoretical" prices were found by multiplying the carcass price for the estimated grade by the estimated yield. For one lot the actual purchase price was $1.10 per cwt. over the "theoretical," for another 59¢ over, and for another 3¢ under. The pertinent point here is not that the actual and "theoretical" prices differ, but that the differential between actual and "theoretical" is not the same for each lot.

The ability of different graders to apply uniformly the present subjective carcass grade standards was studied. Each carcass was graded independently by the federal grader regularly assigned to the plant, by the packer grader, and by the station meats specialist. Both the packer grader and the station grader were within one-third grade plus or minus the federal grade 83% of the time. This indicates that experienced graders do not differ too widely in the application of present grading standards. However, the fact that there is variation in grading brings up one of the very real problems in any widespread adoption of the rail grading method of marketing. Uniform application of standards need to be made to individual carcasses within any one plant and as between plants.

However, in this particular study, the percent of the variance between prices paid and the actual value of the lambs that can be ascribed to grade error was quite small. An analysis of price variance has been made for only three lots to date. The buyer overvalued Lot I an average of 70¢ per

cwt. Lot II was overvalued 20¢ per cwt. and Lot III was undervalued $2.85 per cwt. The results are presented in Table I.

TABLE 1. PERCENT OF VALUE VARIANCE FROM DIFFERENT SOURCES[1]

	Lot I	Lot II	Lot III
Grade error	3.9%	3.7%	4.5%
Yield error	74.2	79.8	77.7
Interaction of grade & yield errors	21.9	16.5	17.8

[1] The basic equation for this determination was $\sigma_T^2=\sigma_g^2+\sigma_y^2+2\gamma_{y_0}(\sigma_g\sigma_y)$.

Approximately 75 percent of the value variance was due to yield error which would be entirely eliminated under the carcass grade and weight method of marketing.

These tentative results reveal a weakness in the present pricing mechanism for slaughter lambs. There is a tendency to generalize prices paid instead of returning to each individual producer the true value of the product delivered. The seller of top quality, high dressing lambs tends to be underpaid and the seller of low quality, low yielding lambs tends to be overpaid.

It is important to note however, that before we know the true possibilities of this method of marketing we must consider not only its desirability but also its practicability. There are a number of problems that need to be solved before the question of practicability can be answered affirmatively. These problems include a satisfactory method of identification, the effect on slaughtering costs, a method of adjusting for differences in by-product values, the extent of tissue shrinkage when animals are held various periods of time before slaughter, and some others. The results of studies to date indicate the need for further research in this field both to further test the results obtained thus far on the desirability, and to shed light on the relatively unexplored problems on the practicability of rail grading.

DISCUSSION*

MARVIN A. SCHAARS
University of Wisconsin

If we adopt the hypothesis that producers of livestock should be paid for their slaughter animals according to their individual values, then investigation as to whether existing pricing methods achieve this goal is a good starting point. Our objective in this study was to see whether inequalities in pricing to individual producers for the same grade of livestock exists, whether the inequalities, if found, are of such magnitude and importance as to warrant serious consideration of a different system of pricing, and equally as important, whether under American conditions of livestock

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

marketing it is practical and economical to change to some other system of pricing.

In many respects the problems which Dr. Dowell and Mr. Engleman faced with slaughter cattle and hogs were more complicated than and different from those confronting us in our study of veal calves. A majority of the cattle included in their study was purchased on a carcass weight and grade basis, and hence, a liveweight price was not negotiated on the animals. The *probable* liveweight price was therefore estimated. In our study, the liveweight prices paid by the packers were obtained. Also, the carcass prices for steers and heifers were computed on the basis of Chicago wholesale beef prices whereas in our study carcass values were based upon the packers' quotations for veal carcasses on the days the carcasses were sold. We did not face the necessity of determining objective grade standards for veal carcasses as was necessary for hog carcasses. Veal, as you know, is sold in carcass form by the packers. Wholesale quotations on the basis of U. S. Grades are used in the trade. Veal is not aged, and sales and shipments were made soon after slaughter, generally the following day. Live prices and wholesale carcass quotations can, therefore, be readily adjusted to one another since there is such rapid turnover of the meat. I should add, however, that we did not ascertain to what extent grades and prices the packers placed on the carcasses differed from the federal grader's grades and from the daily wholesale quotations. To the extent that such changes were made, the actual gross receipts to the packer would differ from the carcass values as we computed them.

Without attempting to describe the procedure of carrying on the tests at two packing plants in the state, I shall briefly review the major tentative findings. The estimated yields of the two buyers varied considerably from the actual dressing percentages. At one plant where 420 calves were checked, the buyer estimated the yield correctly for 14% of the calves, overestimated the yield for 23% of the calves by 1% to 9%, and underestimated the yield for 63% of the calves by 1% to 15%. At the other plant the record was not as good, for there the buyer estimated the yield correctly for only 7% of the calves, overestimated it for 11% of the animals by 1% to 16%, and underestimated the yield for 82% of the calves by 1% to 11%. At the first plant the buyer estimated the yield within 2% + or — the actual yield for one-half the calves, but at the second plant the yield for only one-third of the calves was estimated that closely.

In comparing the estimated grades with the carcass grades as determined by federal graders, considerable variation in the competence of the two buyers was shown. The buyer's estimated grades and the official grades coincided for 33% of the calves at one plant and for 61% at the other plant; were below the official grade for 3% of the animals at one plant and for 20% at the other; were above the official grade for 64% of the calves at the first plant and for 19% at the other plant. At the first plant where two-thirds of the estimated grades failed to agree with the official grades, most of the misses were by one grade, some by two grades, and a few by as much as three grades. But, at the second plant only 3% of the estimated grades deviated from the official grades by two grades. In other

words, 97% of the estimated grades were the same or within one grade of the official grade, which strikes me as quite skilful grading especially in view of the fact that carcass grading is done on a subjective basis where skilled graders may disagree on borderline cases.

At both plants considerable variation within each grade was found in the amounts paid for live animals from the wholesale values of carcasses used as a base. Much greater variation was found for the two lower grades than for the two higher grades.

Conclusions

According to this study, it is evident that considerable variation existed in the returns that individual farmers received for veal calves of equal grade at the two plants. Even at the plant where the buyer was fairly proficient in grading and had a better record in estimating the yield than was done at the other plant, the prices paid farmers failed to provide equality of treatment. Dealing with two variables, yield and grade, and then determining a price which gives proper weight to each factor is unquestionably a difficult matter for a busy buyer in the yards even though a conscientious effort is made to treat each patron equitably. Pricing errors due to miscalculations of yield could be entirely eliminated if carcass weights rather than live weights were used. Likewise, miscalculations of the grade could be reduced considerably by examining the carcass rather than the live animal. From the producer's standpoint, the desirability of having a pricing system for veal calves that would reward individual farmers more nearly for what their calves are worth to the processor is apparent. From the packer's standpoint such a pricing system might also be definitely advantageous. This would not mean that more money would be paid for veal calves by all packers but that a more equitable distribution of that paid out would be accomplished. The pie would merely be cut differently.

Our study, like that of Dr. Dowell's, has not explored the practical problems that would need to be solved before a different system of pricing could be instituted. He has mentioned a number of them. Our research findings point out strongly the desirability of a change in pricing procedure but leaves for further investigation the solution of the practical considerations involved.

ROUNDTABLE ON FARM LABOR

Chairman: John D. Black, Harvard University

CAPITAL-LABOR SUBSTITUTION IN COTTON FARMING*

KENNETH L. BACHMAN
Bureau of Agricultural Economics

SUBSTITUTION of capital for labor has been a characteristic trend of the American economy. In this process of increasing efficiency and decreasing costs, cotton farming has lagged behind most other types. One of the reasons for this lag has been the difficulty of mechanizing the cotton enterprise. The introduction of machinery has made great changes in production of wheat, corn, and many other major crops, but the development of similar machines for cotton has been more difficult. The immobility of the farm population in cotton areas and its relatively high birth rate have been additional problems. But cotton farming seems now to have entered into a period of rapid technological change.

The process of substituting capital for labor in cotton farming may be divided into two general classes: (1) Shifts to enterprises which use more capital relative to labor, and (2) substitution of capital for labor in the existing types of farming.

Capital-Labor Substitution by Changing the Type of Farming

The process of shifting to other types of farming has been going on for more than two decades. In the ten southern States, the proportion of cash farm receipts coming from enterprises other than cotton increased from 38 percent in 1924 to 74 percent in 1946. On many farms this has meant elimination of cotton. With the exception of tobacco and a few specialties, these changes have been in the direction of enterprises using more capital in relation to labor.

In many areas a continued increase may be expected in the importance of other enterprises. Important technological advances have been made in many enterprises including: new varieties, improved fertilizer and cropping practices, and mechanical methods of production. In some areas especially they are changing the comparative advantage of the various enterprises.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

Capital-Labor Substitution on Cotton Farms

Possibilities of substituting capital for labor in those farm organizations in which cotton remains the major enterprise depend in large part upon progress in cotton mechanization. Recently considerable progress has been made in the mechanization of some preharvest operations, and future changes are on the horizon. From 1939 to 1946, for example, the proportion of cultivating and planting done with tractors rose from 21 to over 40 percent.[1] But progress in mechanizing all the operations on cotton has been limited. The two key operations, hoeing and picking, remain relatively untouched. In 1946, less than 1 percent of the cotton was harvested by mechanical methods.[2]

Mechanization to date may be characterized as "partial" rather than "complete." Completely mechanized methods have been used only in certain areas and there partly in response to the unavailability of labor when needed. Completely mechanized methods will gradually increase in importance. But future technological improvements in methods and machines will determine in part the rapidity of the general adoption of completely mechanized methods.

The extent to which farm operators in specific areas can incorporate specific technological developments, the types of capital-labor substitution that may be profitable, and the opportunities for off-farm employment of the labor released might well be focal points for much of the research in the years immediately ahead. Extension and action programs based on such research can greatly reduce the problems and mistakes in this period of transition.

Effects of Capital-Labor Substitution

Shifts to other enterprises as well as partial and complete mechanization in cotton farming *all* seem likely to be of importance in the years ahead. Where these shifts are limited to partial mechanization, some increase in size of farm and amount of supplementary crops seems likely. In some cases, partial mechanization may add to the seasonal leisure or underemployment of operators and of farm wage workers. This may increase the problems of effective utilization of labor especially under depression conditions. Complete mechanization, where practicable, can greatly increase the size of

[1] A. P. Brodell, *Use of Tractor Power, Animal Power, and Hand Methods in Crop Production*, U.S.D.A., B.A.E., F.M. 69, July 1948, P. 26.

[2] Ibid.

farm and it could cause a trend toward specialization in cotton production. Adoption of types of farming which use more capital relative to labor will also encourage larger farms. More employment for the remaining farm families often will be provided through a better seasonal distribution of labor.

Prospective trends in substituting capital for labor will gradually change the farm labor picture. Shifts to other types of farming as well as shifts to completely mechanized methods of cotton farming will reduce significantly the numbers of farm operators and the seasonal and year-round labor needed in these areas. These changes are also likely to increase the importance of family farms. Partial mechanization will reduce the numbers of farm operators and year-round labor needed, but it may increase the importance of seasonal labor.

Incomes and Resources

The wise substitution of capital for labor can be an effective means of narrowing the gap in incomes and resources of people engaged in cotton farming, as compared with those engaged in other types of farming. Individual farmers are often in position to reap a double advantage by making such technological shifts. Not only is the output increased but total costs per unit are often significantly decreased. For example, the operator of a representative large cotton farm in the Southern Piedmont of North Carolina could almost double his output. At the same time he could reduce by more than one-third per units costs exclusive of management and labor performed by the operator and his family.[3] Changes in technology enable individual firms to *shift* to new and lower cost curves and to increase output as well.

These changes would be made possible by shifting from a cotton system to a fully mechanized livestock small-grain system and by using improved practices. Substitution of capital for labor on this farm would result in the displacement of two sharecropper families.

One argument commonly advanced is that the capital-labor substitution by increasing production, especially salable production, will reduce prices and all or most of the benefit will flow from the people engaged in cotton farming to other groups. The importance

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[3] W. W. McPherson, W. H. Pierce, R. E. L. Greene, *Farming Opportunities, Southern Piedmont Area, N. C* In press. Estimates of production and costs based on 1935–39 prices.

of these effects can be overemphasized.[4] In the first place, a large part of the increased production seems likely to be in products other than cotton. Cotton farmers are but a minor group in the production of most of these products. For example, increased production of livestock by cotton farmers would not be expected to reduce prices of livestock proportionally. Increased production under these conditions also means larger returns to cotton farmers. On the other hand, when shifts in cost curves are involved, total costs may be less for the larger production than for the smaller. Reduction of about one-fourth in the physical costs per unit of agricultural output in the United States since World War I illustrates the aggregate importance of these shifts in cost curves due to technological change.[5] Finally, not all capital-labor substitution in cotton farming will result in any over-all increase in agricultural production. Mechanization of cotton hoeing and chopping, for example, may merely save labor without directly increasing total production.

Substitution of capital for labor can increase the returns per combined unit of capital land and labor used in these areas. Will living standards rise to absorb most of these gains and to prevent capitalization into higher land values? Historically, over the longer run, per capita incomes of the labor remaining in an industry have been increased under these circumstances. Certainly the ability of the farming units to pay higher wages for the labor needed will be improved. Further, development of increased skills and responsibilities will improve the quality of labor. But the need for farm labor will steadily decrease and a substantial stream of migration to nonfarm jobs will be necessary. The welfare of the labor released and of the labor remaining in agriculture will be greatly affected by economic conditions and policies. The problems can be eased if off-farm job opportunities are widened by: (1st) Facilities to encourage those inclined to obtain necesaary skills and training for nonfarm work; and (2) full development of industrial resources, especially in areas in which farm labor needs are being significantly reduced.

[4] See. S. E. Johnson, "Agricultural Production After the War," J. F. E., Vol. XXVII, No. 2, May 1945.

[5] M. R. Cooper, G. T. Barton, A. P. Brodell, U.S.D.A. *Progress of Farm Mechanization* B.A.E. Misc. Pub., 1947, P. 64.

AN ANALYSIS OF THE ECONOMY OF USE OF FARM LABOR IN THE CORN BELT*

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THE cooperative project to study the use of labor on cash grain farms in East Central Illinois and North Central Iowa is being conducted by Harvard University and the Division of Farm Management and Costs of Bureau of Agricultural Economics. The objectives of the study are to find how labor and capital are being combined and used on selected kinds of cash grain farms and to determine what kinds of organizations would be best suited to the different kinds of labor forces on such farms. The project is only partially completed, with little analysis having been done.

Selection of the Farms

The Bureau of Agricultural Economics in cooperation with the Illinois and Iowa Experiment Stations conducted a survey in the two cash grain areas early this year to determine costs, returns, and practices on cash grain farms for 1947. The Statistical Laboratory of Iowa State College drew samples to contain 1/96 of the Illinois cash grain area and 1/30 of the Iowa cash grain area. Presumably these samples contained similar proportions of the cash grain farms of the areas within the limits of sampling error.

All of the farms in the small scattered sampling segments were first visited to determine if they were cash grain farms or some other type. A schedule of the physical characteristics of the farms was used to determine the type of the farm. This definition will correspond only approximately with the census definition of cash grain farms which is based on income, but it is believed to be satisfactory as a simple method of determination. All cash grain farms of over 220 acres were enumerated, but only one half of the smaller farms were enumerated. In order to obtain enough returns from large farms there would have been far more from the small farms than were needed if all of them had been enumerated.

When the schedules had been returned and edited, they were then stratified into nine different labor force types, depending on the kind of workers, the length of time worked, and the number of

* A paper given at the Annual Meeting of the American Farm Economic Association on Green Lake, Wisconsin, September 14, 1947.

workers. Four of these groups were designated as "major" types and four were designated "minor" types. The minor types were combinations or variations of one or more of the major types. The ninth class included farms that did not distinctly fit into any class and closely resembled two or more classes.

Farms were then drawn at random from each strata. In each state equal numbers of farms were drawn, so that they could be first treated as separate universes and later as a single universe. In that manner, differences between the two areas might be discovered. In each state twelve farms were drawn for each major type and six farms were drawn for each minor type. The subsample covered slightly more than one fourth of the original sample.

The method of selection gives a different sampling rate for each labor type classification, but this is believed to be more desirable than a constant sampling rate which would give an insufficient number of large farms to draw reasonable statistical inferrences for some of the labor force types. Further, the low proportion of large farms that would be obtained with a constant rate would not give many farms where labor and machinery are likely to be used most efficiently. A larger sample would have been desirable, but time and funds did not permit greater coverage. In fact, the number of farms was larger than originally planned.

Collection of the Data

A schedule was developed which would permit the enumerator to determine the work that had to be done on each farm and the methods of doing it. Once this was determined, it was used as a guide to discover how an operator was able to do so much work or why he was not able to accomplish more. This type of questioning was not suited to a formal questionnaire using objective answers. This meant that the enumerator had to make an evaluation of the answers on the basis of the previous information of the farm, so that farms might be compared.

Those operators who had changed the character or scale of their operations during the past two years were especially questioned on why changes had been made and how they felt the changes were working. Problems peculiar to individual farms such as ditches, wet areas, and irregular fields were given attention.

The second source of information will be the individual schedules which were completed on the original survey. The practice data

gives a great deal of information on how work was done on the farms. It also gives information on the buildings, machinery and labor force that will aid materially in the analysis.

Analysis of the Data

The analysis of the data will be divided into two parts. The first part will find how well farms have been using their labor and capital. This will also indicate the range of differences that exists between farms, which preliminary examination suggests is rather large. This will also be compared with the plans farmers would like to carry out if they were able to procure the materials, labor, and equipment they desired. Again, a superficial examination suggests that the range will remain very wide.

The second objective is to determine what can be done to provide better organization for cash grain farms by using labor, machinery, and buildings in the most suitable combinations. In this study, the labor force has been considered fixed, so we are asking what combination of land and capital (including sizes and types of equipment) will best fit the labor force. This means how much land can one man, for example, handle and what sizes and kinds of equipment can he best use. What kinds of machine work would it be better for him to hire because the overhead is too high? This will be carried out for each of the eight labor forces studied.

All farms will be studied and efficient operations will be segregated. There are doubtless efficient operations on all farms mixed with varying numbers of inefficient ones. Therefore, no single farm is likely to serve as a model for most efficient operation. If the methods of several farms can be studied and the most efficient methods of all farms selected for each operation, there may result a model more efficient than any single farm studied. This will require the construction of eight different models of operating units representing each of the labor force types.

Analytical Problems Encountered

There are some problems that will make the analysis difficult and may limit the application of some of the conclusions to special cases.

First, weather conditions play a large part in determining the manner in which an operator and his labor force may be able to accomplish timely operations. Weather may cut down yields because too much land was farmed compared with the other factors of

production in a wet year. On the other hand, in a dry year, the factors could handle more land quite well, thus being underemployed. This problem may be handled quite well if there are few extremes in weather conditions giving a leptokurtic distribution or even something resembling a normal distribution. If, however, there is wide variation in weather conditions from year to year, then the problem cannot be handled very satisfactorily by any method except by holding excess factors as a reserve for the frequent bad year. This seems to be practiced frequently in the area surveyed.

The second problem concerns the relative prices of the different factors of production, and these relative to the value of the product. If the relative prices of the factors and crop income were reasonably constant, the proportions of each factor used should remain about the same. Therefore, if prices remain the same relative to each other, though they may change, or if the fluctuation of relative prices is small, the problem is not serious. When the fluctuations are very large, the proportions of each factor should change from time to time. The problem does not have an easy solution in this case, but requires a sort of "mean solution" which is likely to be wrong the fewest possible times. Here wide fluctuations are believed more likely than for weather conditions, making this problem seem more serious.

The third problem concerns the change in the quality of the operator's labor with age. A young man can work longer hours and can do more heavy work than an older man. Therefore, how can a one man farm keep a young man fully employed without overtaxing his physical capacities when he is about to retire? Some farms have decreased the amount of work by reducing the livestock or the acreage farmed. Usually, this has meant that the capital has been underemployed, either in the form of unused buildings or in the form of more power and machinery than is required. In some cases, it has taken the form of an increase in the size of the labor force, which frequently means that labor is underemployed because the labor force does not fit the machinery and land. This problem may present difficulties for the "one man farm" though there seem to be possibilities that a satisfactory solution may involve doing custom work when the operator is young and hiring it done when he is older. For other farms, a staggered age of laborers may give a constant labor force.

FARMER-WORKER RELATIONSHIPS*

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EVERY farmer has a labor problem. This is as true for one who is the only source of labor on a farm as it is for the large operator with many hired workers. Both have the problem of using labor as productively as possible. The lone operator has no problems of farmer-worker relations, but his situation is often more difficult with respect to ways of increasing his productivity since his labor supply may be fixed.

Although high productivity of labor is a basic requirement for all farmers, this paper will deal entirely with farmer-worker relationships. Emphasis will be placed upon relationships with hired workers. Most of the same principles apply, however, to unpaid family workers and in some instances to the farm operator himself.

Employer-employee relationships have been of concern in industry for a much longer period than is true in agriculture. Courses in human relationships are now available in schools dealing with industrial and labor relations. Numerous studies have been made and books have been written on the subject.

Agriculture has given but little attention to employer-employee relations. The principal reason is obvious. Until World War II, supplies of farm labor were generally available at what now appear to have been ridiculously low wages.

World War II, however, changed all this. There are some who have anticipated that peace-time conditions would bring a farm labor situation similar to that of the 1930's. Such a development has not occurred. Many farmers have found it as difficult to get and keep good help since the war as it was during the war.

To help answer the question, "How can I get and keep good help?" which was being asked repeatedly by farmers in New York, a study was made of 58 farmers and their "regular" or year-around hired workers in an intensive dairy area in Rennselaer County on the eastern border of the state. Information was obtained by the survey method on practices being followed by farmers in their labor management and on factors which the farmer and hired men

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

considered important in successful relationships. Farmers and hired workers were interviewed separately.

Among the questions asked, was the following: "Based on your experience, what are the most important things for a farmer to keep in mind if he wants to get and keep good hired help?" Each farmer and worker was asked to list the points in the order of importance. No check list was used. Points mentioned by each farmer and worker were recorded in his own words and later summarized and classified as in the table below.

FARMERS' AND WORKERS' SUGGESTIONS FOR GETTING AND KEEPING "GOOD" HIRED HELP
58 Farms, Northern Rennselaer County, New York, 1946–47

Suggestions	Times Mentioned by		Rank by	
	Farmers	Worker	Farmer	Worker
Maximum of privileges	38	33	1	1
"Treat like human beings"	29	26	2	3
Pay good wages	25	29	3	2
Reasonable and regular hours	14	24	4	4
Work with men	12	5	5	9
Careful supervision	12	17	6	7
"Don't drive or be overbearing"	11	5	7	8
Time off	8	18	8	6
Show interest in workers	8	4	9	10
Mechanization	7	18	10	5
Vacations	3	3	11	12
Good working conditions	3	2	12	13
Good management	3	4	13	11

A maximum of "privileges" was mentioned most frequently by both farmers and workers. For married men this meant the use of a house together with varying amounts of farm-produced food and fuel. The size, condition and amount of modernization in a "tenant" house seemed important not only to hired workers but to their wives an families. Privileges for single men usually meant board, room, and laundry in the farm operator's home. Some single men volunteered the information that the farmer's wife's cooking was an important reason why he liked his job.

Farmers placed treating their hired men like "human beings" in second place; the workers ranked it third. "Fair treatment" and "following the Golden Rule" were classified under this general heading. Several farmers referred to unsatisfactory experiences which they had had as hired men.

The paying of good wages was ranked third by the farmers, but second by the hired men. "Good" wages meant the average of the community or higher. Hired workers point out that prompt payment of wages in full was essential. Several also pointed out that while good wages were important, other things were also necessary. One-half of the farmers were paying their wages weekly; formerly payment was once each month.

Keeping reasonable and regular hours was ranked in fourth place by both the farmers and their hired workers. It was pointed out frequently that a definite quitting time, which was strictly adhered to, was highly desirable.

According to farmers, the other important factors in the order of their importance were: Working with hired men, providing careful supervision, avoiding "driving" or being overbearing, giving time off, showing interest in their workers' personal affairs, having adequate farm equipment, giving vacations, providing good working conditions, and having a well-managed farm business.

All of these points were also mentioned by the hired men. Some of them, however, were ranked in different positions. For example: Farmers placed mechanization tenth, but the hired workers placed it fifth.

Some of the specific practices of the farmers in managing their hired help were rather significant. One-fifth of the farmers were paying bonuses or sharing profits. On the average the farmer worked 60 percent of the time with their men. Almost two-fifths of the farmers were giving at least one-half a day off each week. One-fifth of the farmers granted sick leave with pay for an average of 16 days per year. One-sixth of the farmers gave an average of two weeks vacation with pay each year. Almost one-half of the remaining farmers gave an average of 13 days per year with pay for attending auctions, going hunting or fishing, and transacting personal business. Although insurance against accidents is not required in New York, 30 percent of the farmers were carrying workman's compensation insurance or farmers liability insurance with medical payments.

Although several important essentials for successful relationships were highlighted, it appears that maximum success requires a combination of many things which may appear unimportant individually, but which when taken together, are extremely significant, especially to the hired man.

This survey was designed as a pilot study to help develop plans for more comprehensive work in the future. Any plans which are made will include the following :

(1) Obtaining a much larger number of records.
(2) Obtaining records in several different counties.
(3) Including some farmers who have been unable to keep hired help.
(4) Developing an objective measure of the degree of success in farmer-worker relationships. Numerous methods were tested with these data, but no satisfactory single measure was found. The rate of labor turnover, the average years the present worker had been on the farm, output per man, and numerous others proved unsatisfactory. Possibly larger numbers of records will provide the basis for a satisfactory measure.

THE FUNCTIONAL APPROACH TO EFFECTIVE FARM LABOR UTILIZATION*

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EFFECTIVE use of labor is generally taken to mean high productivity per worker. To obtain maximum output per unit of labor input, careful consideration of all resources entering into farm production—not just labor alone—is necessary. Therefore, how well labor is used depends upon: (1) the quality and amount of physical, economic, and human resources available and (2) decisions on farm organization and operation ranging from those pertaining to enterprise combination and size of business to equipment choices and work methods.

This discussion, however, is limited to farm operations. It is assumed that for a given farm the land resource pattern is set and that decisions regarding general farm organization are made. We are thus limiting ourselves to the problem of how to perform the necessary work. Based upon our experience in work simplification research,[1] it seems to us that the problem may profitably be approached in this manner:

1. *Classify the work into the necessary functions which must be performed.* For example, to produce livestock it is necessary to perform the functions of roughage and bedding handling, feed handling, provision of water, moving of animals, and manure removal. In the cases of roughage, grain, and bedding the performance of the function extends from harvest through storage and feeding. The functional classification is thus on the basis of complete processes rather than on an enterprise, job, or seasonal basis.

2. *Develop detailed standards or input-output ratios* (for labor, machines, equipment, and buildings) for different ways of performing each step in the process involved. These standards or ratios should be in physical quantities (as accomplishment per unit of man or machine time or minutes per ton or per acre), should carefully define the method and the working conditions, and should

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[1] Lowell S. Hardin and R. M. Carter" An Analysis of Work Simplification Research Methods and Results," this JOURNAL, Vol XVIII, No. 1, February, 1946, pp. 320–330.

carry a quality determination (where pertinent) for each step in the process.

3. *Work out the most effective means of performing each function for "type" situations.* This step is accomplished through analysis and manipulation of the standards: (a) by direct comparison of different methods and complements of equipment for each part of the process; (b) by the budget or substitution method; and (c) by synthesizing new processes or means of performing the necessary functions. It is at this point that principles of work simplification or labor economy should be applied to improve existing methods wherever possible.

4. *Test conclusions under actual farm conditions.* This suggested four-step procedure raises certain questions which we can discuss briefly.

Why the emphasis on functions? Because the functional approach cuts across enterprise lines, it should result in an answer most economical for the farm as a whole. This may be quite different from the answer obtained by studying one enterprise alone. For example, while hours of hay-chopper use may be too small for economy when hay alone is considered, additional use for straw and silage may make the machine a practical consideration.

Is the collection of physical data—standards or input-output ratios—the task of the economist? Properly, this is technology.[2] Because these data are essential to more refined economic analysis, however, the economist will probably have to assist, at least, in obtaining them. These data can probably best be obtained in three general ways: (1) from carefully selected case studies; (2) from controlled experiments (simulating farm conditions) performed in cooperation with agricultural engineers and production scientists; and (3) from well designed purposive surveys.

The controlled experiment has much to offer in this type of research, both in collecting data and in checking results. Actual observation and careful measurement are necessary. In this connection, professional farm management organizations are often willing cooperators. They frequently can provide cases for observation and farms on which to test conclusions.

Whatever the method of collection, the file of standards or input-

[2] For a more complete discussion of this question, see Earl O. Heady "Models in Farm Production Economics Research," this JOURNAL, Vol. XXX, No. 2, May, 1948, p. 210.

output data will never be fully adequate. It is time, however, that a start be made in this direction. Results—standards or input-output ratios—if carefully defined, can have wide use. No one state or area need build up all its own standards. In using these standards for budgeting and synthesizing methods, some adaptation of data or estimation is usually necessary. But this is not uncommon. Even feeding standards, which we generally accept and use, also require judgement in their interpretation.

We can say, therefore, that the four-step procedure outlined above provides: (1) a basis for reasonably accurate cost comparison of methods; (2) a systematic means for developing improved work processes; (3) a definite planning and scheduling aid; and (4) a research method which is creative and forward looking. The results of this research should provide the farmer not only with facts on which to base his decisions, but also with some specific suggestions in the area of farm operations.

Management engineers and economists in urban industries are applying the same basic principles and laws that obtain in farm management. In many instances, industry-developed standards and input-output ratios of the general type suggested here have been used effectively. Agricultural management people have contended that farming is too diverse and variable for accurate use of standards or specific input-output ratios. On analysis, however, differences between urban industry and farming are frequently more apparent than real. Based upon industrial experience and farm work simplification research, it appears that analysis of farm work by functions and the development of standards or input-output ratios for farm work and farm equipment can provide needed fundamental facts. Intelligently applied, such a functional approach can make a real contribution to more effective farm labor utilization.

CANADIAN AGRICULTURAL MANPOWER PROBLEMS*

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CANADA is faced today, just as is the United States, with a generally tight labor situation. With present and prospective national income and investment in both countries higher than during the war years, it is to be expected that employment would also be high. In view of these trends, as well as the established "full employment" policy of the federal government, the prospects are for continued high employment for some time.

Faced with this situation the question arises, can agriculture be expected to secure the manpower it needs in competition with other expanding industries? An answer may suggest itself immediately; with the high demand for food products and the improved prices for most farm commodities, farmers can offer wages as attractive as other industries, and thus, especially today with increased farm mechanization, they should be able to meet their labor needs merely by encouraging fewer of the "surplus" farm workers to leave agriculture each year.

The solution is not quite so simple as this answer might indicate. In the first place, even though farm prices are relatively high and farm wages have risen correspondingly,[1] it does not follow that workers will be attracted to agricultural jobs or that all of those already in agriculture will wish to remain. There are strong indications that as long as jobs are available in urban industries workers from agriculture will be attracted to them. Comparable wages in farming will of course be an offsetting consideration, but such items as year round jobs, unemployment insurance, workman's compensation, superannuation, better housing and urban living are likely to be, individually or collectively, over-riding considerations "pulling" towards city or town employment. A number of well-known "push" forces operate in the same direction.[2] These include farm mechanization, long hours of work, isolation and frequently

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1947.

[1] The index of farm prices of agriculutral products, based on 1935–1939—100, stood at 204 for 1947 for Canada, and at 259 for the United States. The monthly farm wage without board had risen by the spring of 1948 to $113 in each country.

[2] cf. "Factors Conditioning Innovations in Agriculture" by John D. Black, *Mechanical Engineering*, March, 1945 pp. 181–182.

poor living conditions. Some improvement from the standpoint of agriculture, especially in commercial farming areas, has occurred in some of these latter items during recent years, but with better communication, including radio and rural film, farm workers are becoming more informed of conditions of employment elsewhere. The mingling of rural and urban youth in the services and in wartime employment worked to this same end.

In addition it should be noted that the birth rate in commercialized farming areas is frequently as low as, if not lower than it is in urban centers; in fact in some specialty farming areas, even with the reduction in labor needs accompanying mechanization, it is doubtful whether farm families with present rates of reproduction could supply all the labor needed, that is assuming all remained in agriculture.[3]

Some workers, it is true, might move from subsistence farming areas but, even with special inducements introduced during the war years, not many persons from such areas went to other agricultural districts. Thus, when many of those for whom it would be advantageous economically to move, do not do so and when both pull and push forces are at work on those in commercial farming areas, there is not much prospect of reducing substantially farm labor shortages through any slowing up of the rural-urban flow of workers; in fact as long as high level employment continues it appears that the trend will be in the other direction

If then there is not much prospect of assistance in meeting farm manpower requirements from other industries under full employment conditions, where else can aid be obtained for those farming areas where shortages of labor occur? There are at least three other possible approaches which need examination. These are organized shifts of farm workers; experienced agricultural workers from other countries; and improved use of labor.

Organized Shifts of Farm Workers

Considerable success was achieved in Canada during the war years in arranging controlled movements of farm manpower on a seasonal basis. These movements, developed by the Department of

[3] *What's ahead in Farm Labor?* by George W. Gill, Farm Labor Program, U.S. D. A., 1947, p. 8; in six representative southern Ontario counties in 1946, namely Middlesex, Brant, Halton, Waterloo, Hastings and Carleton The birth rate in the rural areas ranged from 16.3 to 24.0 per 1000 population, while the rate in the urban areas ranged from 26.1 to 30.3.

Labor under the joint Dominion-Provincial Farm Labor Program, are continuing during the post war period. The principle which underlies these organized movements is that it is in the national as well as the individual's interest to encourage workers who can be spared for a short period in one area to move to another area where their services are needed. A number of safeguards are introduced for the protection of employers, both in the supplying and receiving areas, and of the employees. These include: no transfers unless local supplies of labor are insufficient; quotas for the number of volunteers in each locality; approval only of applicants who are physically fit, experienced farm workers; guaranteed wages at current specified rates; submission of employer's applications in advance; screening these applications to ensure that labor is sent first to those farms most in need of it; and continuous daily contact between recruiting and receiving areas to ensure that the forces of supply and demand, which in these cases operate as many as three thousand miles apart, are kept in as close adjustment as possible. These organized movements include several between provinces and between the United States and Canada, but perhaps the best example of this regulated farm labor market is the two-way movement of young workers between the Prairie and Central provinces.[4] The eastward movement for haying and early harvesting in Ontario takes place in the early summer after grain is seeded and summer fallowing is well advanced on the Prairies; the westward movement for grain harvesting on the Prairies takes place between August 15 and September 15 as work in Ontario and Quebec begins to slacken and the harvest work in the West is getting into full swing.

These organized transfers of labor to meet urgent seasonal needs have proved valuable in making labor more mobile and in effecting a better over-all allocation of manpower on the farm. It is generally agreed that the quality of the workers moved under these plans is higher than under earlier, more haphazard migratory movements. The planned organization of the labor market also results in less waste of time and effort for both employees and employers, as well as creating less disturbance to the areas from which the workers are drawn than would be the case otherwise. Besides

[4] In 1947 there were twelve major organized movements, involving approximately 20,000 workers: six of these movements were across the international boundary.

achieving the immediate objective of meeting farm labor requirements with qualified workers, the individuals participating in these movements are able to increase their annual earnings and to obtain useful experience in agriculture in another region. Considering the over-all gains obtained from these movements, travel assistance provided by federal and provincial governments amounting during 1947 to approximately $20 per worker for each government does not appear excessive.

These organized shifts of farm workers appear at present to offer the best hope of meeting the seasonal needs of farm manpower where available urban as well as rural local labor is adequate. Over a longer period, however, the need for them may grow less. They are not as suitable, however, on the basis of present conditions to meet year round labor requirements. For these it is necessary to search elsewhere.

Experienced Farm Workers from Other Countries

The largest single source which has been found for year round experienced farm labor is Western Europe. This labor, which first became available in 1946, consists of three main categories: Polish veterans who fought for the allied armies under British Command, "displaced persons" located in the occupied zones of Germany and Austria; and interested workers, either as individuals or groups, from other western European countries, notably the British Isles and Holland.

The Polish veterans, who number slightly over 4,500, came to Canada under an over-all plan developed between the British and Canadian Governments. Selected from interested unmarried applicants, with experience in Polish agriculture, they each agreed to accept employment at current wages in agriculture as directed by the Canadian Minister of Labor, and to remain in agriculture, not necessarily with the same employer, for at least two years. The farm employers on the other hand submit written applications so that their needs can be appraised and their living and working conditions checked in advance. They must also guarantee year round employment at going wages in the community.

The plan, on the whole, is working well. A number of factors are responsible for this. Among these are: the eagerness of the men to become established in a new country; the care taken in matching their skills with the needs of their employers; and a systematic

placement follow-up by local National Employment Service and Provincial Agricultural Extension officers under the Farm Labor Program. This follow-up has enabled grievances to be removed before they become serious and prompt action to be taken in shifting veterans to other farms where this is in the best interests of all concerned.

Organized plans are also in operation for the farm workers now coming to Canada from the displaced persons camps, Holland and the British Isles. During the first half of this year over 6,000 single and married men, and single girls have been placed in agriculture in all of the nine provinces, from these western European sources.

It is too early to know what the long run effects of these immigrant groups of workers will be on the farm labor problem. It is well known that a large proportion of earlier groups of immigrants left agriculture at the first opportunity for urban employment in Canada or the United States. Steps are being taken under the Farm Labor Program to encourage those now arriving to remain on the farm but whether a larger number will wish to remain is uncertain. There appears, however, to be almost no limit to the number of Europeans who would like to come either to Canada or to the United States. The only serious question at present that has to be considered carefully is that the number of workers selected does not exceed the absorptive capacity of Canadian agriculture.

Improved Use of Labor

In addition to the organized transfers of workers to meet seasonal needs and the European workers largely to meet year round needs, a third approach to the problem of securing adequate manpower for agriculture and probably the one likely to be of most importance over the long run is a fuller utilization of labor already on the farm including more mechanization, wherever mechanization will itself increase efficiency.

Although notable improvements have occurred, labor efficiency in agriculture is still generally low. The loss of farm manpower during the war and the replacement of it by mechanization wherever possible have forced farmers to give greater attention to the use of labor. As a result more farmers today are recognizing that it pays to work out efficient methods of doing jobs around the farm just as much as it does to improve crop management or the care of of livestock.

One of the many ways in which labor efficiency can be increased is through greater stability of work on the farm. The provision where possible of more year round employment will contribute to this objective. Closely related is the need for suitable housing for employed workers. Inadequate housing and long hours of work are undoubtedly two of the most important factors militating against better labor utilization and giveng rise to the exodus of manpower from agriculture.

Some steps have been taken under the Farm Labor Program in this field. These include the preparation of a two reel colored film entitled "Workers on the Land"[5] and of a bulletin entitled "Better Farm Living for Workers on the Land."[6] These and others similar educational efforts are made easier by the fact that the Farm Labor Program is a joint one between the federal Department of Labor and the Provincial Departments of Agriculture. The agricultural extension machinery of the latter departments is a logical avenue through which farmers can be approached on this important matter. The federal Department of Labor on the other hand, with its national perspective and its over-all concern with employment, is able to stress the bearing of efficiency on the allocation of all manpower and can draw on experiences of other industries in pointing to ways in which productivity of labor may be increased.

In conclusion it is clear that under present high level employment conditions the farm labor situation needs careful watching, just as it did during the wartime emergency, if manpower and other resources are to be used in the best interests of the country. When an increasing number of farmers have a large amount at stake in their crops and livestock; when there continue to be economic and sociological obstacles which make it hard for them to compete with other employers in the labor market; and when Canada has definite commitments to supply food to other countries, the problem of securing an adequate labor force can be left no longer to the old hit and miss methods. Workers, too, need some protection in the farm labor market, especially when they find themselves up against inferior living and working conditions about

[5] Produced in 1947 by the National Film Board, Ottawa, in cooperation with the Federal Department of Labor and the Federal and Provincial Departments of Agriculture.

[6] Published by the Federal Department of Labor, Ottawa, 1948.

which, as individuals in the absence of union organization, they can do little.

The steps enumerated above, namely organized movements of experienced farm workers, importation of Europeans and the encouragement of better labor utilization, are helping to meet most of the current farm labor requirements in Canada. It is true, too, that they may point the way to beneficial longer run policies but it is recognized that they have not met all farm labor problems. Much more research is needed on farm labor and, besides, important changes in the position and organization of Canadian agriculture will have to come before satisfactory solutions to many agricultual manpower problems can be reached.

ROUNDTABLE ON LAND USE POLICY IN THE RIVER BASINS

Chairman: Gladwin E. Young, Bureau of Agricultural Economics

POLITICAL AND OTHER PROCESSES IN FORMULATING AND IMPLEMENTING LAND USE POLICIES IN THE RIVER BASINS*

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POLITICS is conceived here as a struggle for power to control the personnel and direct the policies of government. The Missouri Valley will first be analyzed as an area of partisan strategy; later, the need for a political forum in the Valley will be suggested. The underlying assumption of a higher degree of rationality in politics than many will allow is reflected (a) in the premise that a successful developmental program in the Valley will redound to the advantage of the party receiving credit for it, and (b) in the assumption of a higher degree of responsible party leadership, that is, of control by the party over its individual members, than presently exists.

I. Partisan Strategy

1. *The Missouri Valley and the balance of power between the parties*

The area in which the Missouri lies, as the Populist revolt and the campaigns of 1912 and 1924 indicate, is politically independent—or so history says. Hence one asks: How significant is the area in the balance of power between the parties?

The chief pride of partisan politics is the Presidency. Omitting Iowa because of its traditional Republicanism in Presidential elections, only 50 electoral college votes remain in the Missouri Valley. Of these, Colorado, Kansas, Missouri, and Nebraska have 35. Examination of the popular vote in each of the 1928–44 presidential elections in these four states discloses very few narrow margins of victory; and in these few examples, the effect of a shift would have been negligible. Thus the Valley appears of little moment in campaign strategy concerning the Presidency.

What about the national House of Representatives (H. of R)? In the 29 H. of R. seats which lie "within the Valley," there were 87

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

contests in the elections, 1942–46. Arbitrarily considering as "close" elections in which a five percent shift would have changed the result and "fairly close" those requiring less than eight percent shifts, we find 25 close and 14 fairly close elections out of 87, or 44 percent. Eliminating the nine close seats in Missouri, however, only 19 close and fairly close elections appear out of 57—or 33 percent. At most, 14 House seats appear subject to influence by either party successfully claiming credit for Missouri Valley development. Yet review of the last 14 Congresses discloses only three in which the margin of partisan control has been so narrow as to have made significant a "block" of close seats such as lie in the Missouri Valley.

The Senate. 16 Senatorial seats are involved in Colorado, Wyoming, Montana, the Dakotas, Nebraska, Kansas, and Missouri. Using the same criterion as were applied to the H. of R., 16 close and 8 fairly close elections appear out of the 48 Senatorial contests between 1928 and 1946.[1] Since 1920 there have been 14 Congresses in eight of which a shift of ten Senatorial seats, or less, would have changed party control. The strategic importance of the Senate to both parties in the 1948 election has been reiterated. Long periods of precarious party control in the past (chiefly 1874–1896) add to the strategic significance of the Missouri Valley Either party would profit considerably if it could markedly improve its chances of Senatorial victory in this great area.

Moreover, improvement of party discipline may be involved. The area in question has notably swelled the ranks of insurgents, as analyses of the Farm Bloc members of the early 1920's or their Progressive predecessors a decade earlier will show. Political insurgency, as well as political independence seems closely related to economic instability in the Missouri Valley; hence both may be mitigated by any program which markedly helps stabilize the regional economy. But this remark calls up two other issues: (a) the adjustment of urban and rural claims, and (b) the reconciliation of north-west south-east conflicts in the Valley.

2. *Partisan strategy, urban and rural adjustments, and intersectional conflict*

In the Dakotas, Nebraska, Kansas, Missouri, Montana,

[1] *Vote Cast in Presidential and Congressional Elections, 1928–44*, Dept. of Commerce, Bureau of the Census, 1946; *Congressional Directory*, 80th Congress, 2nd Session.

Wyoming, and Colorado which, while not co-extential with the Valley, should offer a reasonable guage of trends there, total population declined seven percent in 1940–45, according to the census. Practically all of this occurred within the farm population, which declined 22 per cent absolutely and from 33 to 28 percent as a proportion of total population. If uneven, the downward trend in farm populations has been marked in each of these states since 1920.

These figures suggest the wisdom for partisan strategists of favoring industrial and urban aspects of Missouri Valley development. This conclusion is generally borne out by W. E. Binkley's counsel to marshall electoral strength by calculated appeals to emergent groups and interests. Urging the Republicans to imitate the Democrats, he writes: "No longer will it be quite so much a matter of carrying the East, the West, or the prairies, but rather that of luring youth and the labor and the urban vote." But beyond the manipulations for immediate partisan gains lie higher political considerations. In the *Politics of Democracy*, Pendleton Herring has urged the need to balance "ideas, interests, and institutions." If emergent interests are urban, industrial, and commercial, while political institutions favor rural interests, adjustments are indicated not merely in the content of public programs but also in the *forms* of political institutions.

Herring's counsel is based upon analyses as old as Aristotle, who found a cause of revolutions in the disproportionate increase of social groups or classes without corresponding adjustments in governmental forms. Yesterday's newspaper emphasizes the same point, respecting the progressive urbanization of Kansas. "On nearly every burning issue, the towns and cities have been lined up against the country." Urban interests are said to favor reform of the Constitution of 1859, but the rurally-controlled legislature (one representative from each of Kansas's 105 counties, however small) has defeated every move to call a constitutional convention.[2]

Some qualifications are necessary, however. Binkley appears

[2] Some of the conflicts reported are relevant as illustrations of the issues which have to be reconciled politically in any valley resource developmental program. "Cities and towns pay the lion's share of state taxes, but get the least in dollars-and-cents benefits. Urban areas are pressing for flood control projects, but farmers don't want their lands flooded by dams. Cities and towns want highways leading to their merchants. But counties fight the abandonment of every mile of obsolete roads." Peter Wyden, New York *Times*, 29 Aug. 1948, p. 6E.

generally correct in adjuring Republicans "to shift from the old emphasis upon the strategy of sections to the strategy of interest group diplomacy." Yet the Missouri Basin program is strongly, if by no means exclusively, sectional; moreover, there is an important sectional cleavage within the Basin: downstream interest in flood control and navigation as against upstream interest in irrigation.

A possible guide to party strategy under these circumstances is found in the significance of the area for control of the Senate. Otherwise, the issue might safely be arbitrated in favor of downstream interests. Most of the doubtful H. of R. districts are in Missouri; doubtful districts in Colorado and Nebraska are urban (Denver and Omaha), while, generally, the remaining rural H. of R. districts seem so safely Republican at present as to be possible for both parties to disregard—so far as the strategy of control is concerned. Again, the bulk of the population lying in the southeastern part of the Valley, would tip the scales in favor of this "section within a section." But six of the 18 Senators involved are in territory where irrigation constitutes a primary purpose, while eight more Senators have the difficult problem of adjusting conflicting interests within their own states. Consequently, the purpose of irrigation development is strong enough to demand and receive recognition.

3. *Summary*

For partisan strategy, the Missouri Valley is most significant with respect to control of the Senate although also of some importance regarding the H. of R. Equally, policies of either party for the Valley must consider trends toward urbanization and industrialization, trends which may be further stimulated by a comprehensive program of Valley development. An added complication is the inter-sectional issue over the use and management of the water. Urban versus rural interests, upstream versus downstream—these would seem enough without being worse confounded by considerations of partisan strategy for control of the Senate. From the analysis, it is obviously difficult for the parties to design programs which are successful strategically while also sufficiently appealing to win the support of the bulk of the interests involved. Yet the analysis ought also to underline the significance for society

of the political process from which some kind of answer is produced to pressing problems like the above.

II. The Significance of Political and Administrative Organization in the Missouri Valley

Descriptions of the evolution of the present Missouri Basin program dwell heavily upon the roles of private groups and interested governmental agencies as well as upon the action of Congress and the President. Consequent enactments, chiefly the Flood Control Act of 1944 and the Rivers and Harbors Act of 1945, are full of compromises. But behind the compromises are conflicts of organized interests.

Thus in the 1944 Act, Congress gave irrigation priority over navigation; yet, as Hart points out, the separate authorization in the 1945 Act of the 9-foot channel from Sioux City to the mouth of the Missouri leaves the situation confused. The compromise on administrative responsibilities further reflects the clash of groups and agencies. The Bureau of Reclamation (B. of R.) is given planning authority, and developmental authority as rapidly as Congress authorizes specific plans and provides appropriations, for the Valley west of the 97th meridian. The Army Engineers (AE) is given similar authority to the east. Generation of electric power is placed last on the list. Power is to be distributed by Interior, subject to Congressional conditions, including rate schedules as set by the Federal Power Commission. Federal investigations on watersheds and measures for run-off and water-flow retardation and soil erosion prevention are responsibilities of the USDA. Recreation development is divided between the Interior and the AE in their respective bailiwicks.

Congress has further required mutual submission of plans between the B. or R. and the AE as well as to the governors of the states concerned. The upshot has been administrative organization of the area by departments, plus establishment of inter-agency committees in Washington and in the Valley. The latter committee includes the state governors.

Numerous criticisms have been made of these arrangements.[3]

[3] A penetrating criticism is Henry Hart, "Valley Development and Administration in the Missouri Basin," *Public Administration Review*, Winter, 1948; see also Charles McKinley, "Federal Field Integration and the Valley Authority," and William Pincus, "Shall We Have More TVA's?", same source, Aut., 1946, and Spring, 1945. C. Herman Pritchett has ventilated problems of national coordination

Yet, as most critics recognize, it is neither mere arbitrariness nor lack of imagination which produce the present unwieldy administrative organization, but rather the continued existence of unresolved conflicts. Among government agencies beset by difficulties, the worst off are commonly those charged with arbitrating differences among powerful "private" groups, associations, and interests. The significant thing about the Missouri Valley is that conflicts over the different uses of water are strong enough to keep controversy alive through all stages: proposals, debate, legislative sanction, planning, the securing of appropriations, and development.

From this it appears that no stroke of genius in perfecting administrative organization will liquidate the conflicts in the Missouri Valley. At the same time, the present program and its operation appear to deny certain important purposes the consideration that they deserve. Some of these under-emphasized purposes are power development, the integration of agricultural research and education with irrigation development, and the promotion of recreational facilities. Other purposes which may be neglected are epitomized by TVA's resource and development studies, e.g., studies respecting freight rates, the use of electric power for farms and industries, community planning, and health and sanitation as related to water use.

Reviewing the emphasis upon some purposes, at the apparent expense of others, one is tempted at once to espouse an MVA instead of the present organization. A Missouri Valley Authority could clearly be vested with comprehensive powers over the development, management, and control of the Missouri River and its tributaries.[4] It would be legally possible to create an MVA with full powers of a "water-master," including power development; in addition authority could be granted to perform research and demonstration with respect to related matters like sanitation and

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in "The Transplantability of the TVA," *Iowa Law Review*," A Symposium on Regional Planning," Vol. 32, No., 2, Jan., 1947. This review carries a number of other articles of interest. Report #2, Public Affairs Institute, Washington, D. C. (1948), analyses 15 "unfinished tasks" in the Valley and relates shortcomings regarding most of them to imperfections in the conception, organization, and administration of the present program. See also Rufus Terral, *The Missouri Valley*, a lively account, with bibliography.

[4] *U. S.* v. *Appalachian Electric Power Co.*, 311 U. S. 377 (1940) and *Oklahoma* v. *Atkinson Co.*, 313 U. S. 508 (1941).

health; fertilizer production, distribution, and use; erosion control; and the development of natural resources generally. Congressional permission, and perhaps Congressional preference, for carrying out these latter functions through contracts with state and local agencies might be included in the legislation.

Yet the conflicts which plague the present organization would remain for an MVA. These conflicts are so severe as to require political resolution, yet the valley is not a political forum: it has no co-extential government and legislature. The Congress, of course, is the political forum for the area; but it is remote, is pressed by multiple concerns, and is characterized by competing committees. Joseph Kinsey Howard tells how the controversy over commitment of Senator Murray's MVA bill in 1945 was finally compromised by sending it to *three* committees in turn for sixty days each—Agriculture and Forestry, Commerce, and Irrigation![5]

Therefore, the following proposal is offered. If an MVA is contemplated, a special joint committee of Congress might be created to preside over its establishment and to supervise its operations, subject, of course, to general Congressional approval and to the influence of the President (as well as presidential control through the veto, where legislation is involved.) This committee would be composed of those members of the H. of R. whose districts fall either all or in part within the Missouri Basin as well as Senators from the states concerned.[6]

A committee of this kind would be difficult to establish. It would run counter to the principle of seniority, and it would violate internal control by the Congress over committee assignments. Opposition might be expected from Congressmen who enjoy positions of power in important committees, the jurisdictions of which might be threatened by the creation of the proposed committee. If the majority on the proposed committee were of a different political completion from the majority in either House of the Congress, a serious problem might be raised. [7] Finally, if such committee were

[5] "Golden River," *Harpers*, May, 1945.

[6] This would make 29 Congressmen and 17 Senators, including in the latter the senior Senator from Iowa, but none from Minnesota.

[7] Sometimes this problem might be resolved by providing for control within the committee by members of that party which held a majority in the general Congress; but if the joint committee were overwhelmingly dominated by the minority party, this stratagem would defeat the initial purpose of establishing the committee, namely, to provide a political forum for the area. In 1944, for example, the committee would have been heavily Republican in a Democratic administration—12 to 5 Senators, and 23 to 6 Congressmen.

established and flourished, its existence might aggravate the difficulties of national supervision and control of public programs in the region.

Still, there are compelling arguments for creating such a committee. It seems that the Congressional representatives, elected from the area and having to live with its problems, could well be charged collegially with the responsibility for making recommendations to the entire Congress upon such issues as the following. First, the management and use of water with respect to conflicting demands of those interested in flood control, irrigation, navigation, and power, and the allocation of developmental costs among these. Second, priorities among specific developments. Third, decisions as to power development and distribution, e.g., respecting erection of steam plants to firm up the power supply. Fourth, recommendations for action on proposals by MVA as a result of its resource development studies.

Creation of a joint Congressional Committee for the Basin might help constitute a regional political forum. The existing "anonymity", so far as the general public in the area is concerned, of present Congressional committees should be removed. Political issues affecting the entire area might be raised more sharply in campaigns as the electorate came to understand that it was choosing a regional committee. This might lead to more active participation in elections and the assumption of more responsibility on part of the voter. The importance of the general electorate should be enhanced over interest groups. An institutional device which encouraged greater party responsibility might have been provided. An appropriate political forum would have been created for raising issues related to rural-urban conflicts and to inter-sectional grievances.

The proposal has other bearings upon the organization and control of power. With a more responsible administration for the Valley provided—with a clear-cut group of legislators behind whom existed an ascertainable and interested electorate, a vexing problem in the legislative oversight of administration might be mitigated. The new institution should improve the ability of the valley-dwellers to control their own destinies. This might modify the widely-noted drift toward centralization in government. Nor does the proposal necessarily entail a sacrifice of the states; it should be recalled that the joint Congressional committee would be elected

from states, under state election laws, and as candidates of parties organized along state lines; moreover, Congressmen quite typically serve apprenticeships in their state legislatures and are bound to the institutions and destinies of their states in many ways.

III. Does Partisan Strategy Have a Bearing Upon the Need for a Political Forum in the Valley?

The Republicans, solidly in control of the area at present, would expect to dominate the committee; a situation which might constitute an argument for Republican advocacy. The Democrats, stronger, here as elsewhere, in the urban areas, but weak on the committee at present, might still favor its establishment. For the committee would afford the Democrats an opportunity to raise political issues in terms of the entire region and in light of the development of a different pattern of interests. But the Republicans might also welcome the opportunity of evolving counter-proposals in the light of growing urbanization. In short, creation of a political forum for the area would give both parties the opportunity of bidding against each other for electoral support on the basis of a valley-wide program. At the same time, the task of designing programs with wide appeal would call for considerable statesmanship, with which both parties naturally feel they are well-supplied.

PHYSICAL, ECONOMIC, AND SOCIAL FACTORS IN FORMULATION OF LAND USE POLICIES IN RIVER BASINS*

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THERE are certain broad relations of climate to the use and control of water resources that have influenced the development of water policy. In humid parts of the country where precipitation exceeds the needs of agricultural production, control and removal of excess water has always been a problem. In such areas Federal and State programs have emphasized navigation, flood control, and drainage. Water rights have developed under the riparian doctrine which bases the right to water use on the ownership of land contiguous to a stream.

In the arid West insufficient precipitation is available for agricultural production. The mountains yield excess water but the supplies from mountain streams are inadequate for all the lands that might be irrigated. Special Federal and State programs have been developed to stimulate the productive use of water for irrigation in the West. Water rights in this area were developed under the doctrine of prior appropriation. This doctrine emphasizes beneficial use and affords protection to enterprises for diverting waters and applying them to lands whether or not they are contiguous to water courses.

The Missouri River Basin represents a transition between these two major climatic zones with their varying backgrounds of water and land use policy. The Basin, therefore, makes a good case study of policy formulation. The lower Missouri Basin States are definitely in the humid section, and the upper or western Missouri Basin States are partly in the semi-arid West. The central or Great Plains portion forms a transition zone with a highly variable climate and an unstable agriculture. An outstanding feature of the development of a water program for the Basin has been the conflict and the necessary compromises between the divergent humid and arid water policies. Proposals for flood control and navigation represented an evolution of the policies from the more humid part of

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

the country. Proposals for irrigation developed from experience in the arid West. The conflict between navigation and irrigation was settled in 1944 when Congress gave priority to irrigation for water originating in states wholly or partly west of the 98th meridian.

The central problem in river-basin development is to maximize the beneficial use of the water resource and to minimize its destructive powers at costs commensurate with benefits. The problem has two phases: management of the watershed; and use and control of water in the stream channels. In the Missouri Basin, on-channel water development projects have been first to receive authorization from Congress. The authorization includes over 100 reservoirs, irrigation and power facilities, a levee and navigation system on the main stem from Sioux City to the mouth, and local flood protection works. This plan will provide for the irrigation of 4,700,000 acres of new land, generation of 10 billion kilowatt hours of power annually, and flood protection for 2 million acres of agricultural land, protection for numerous cities and towns, and other improvements. Policy toward Federal investment in watershed management is not so clearly defined as in the policy for investment in structures for river control and water use, although a start has been made in legislation for conservation and flood control.

Maximizing the beneficial use of water where it falls on the watershed for growth of protective vegetation, and for agricultural and forest production and the removal of excess waters without damage to watershed lands are problems in the conservation and management of land. In the Missouri Basin, 80 percent of the land is privately owned and a major portion of the public land is used for agricultural production. Conservation and management of land will be carried out by these thousands of land owners and users to the extent that benefits accrue to their operations or that they are stimulated to action by Federal and State programs. Public benefits from watershed management and protection of on-channel structures are important factors in determining the public investment in conservation of private lands.

The Mountainous areas in the western portion of the Missouri Basin yield an excess of water over the protective and productive needs. Because of its origin in the headwaters of the Basin, this water makes up the major portion of the supply available for irrigation. Most of the high yielding watershed lands are in public ownership. The water yield of these lands is the most valuable pro-

duction and a major objective of watershed management is, therefore, to improve the quality and increase the yield of water.

In the more arid parts of the Basin and under certain local slope and soil conditions, available water is hardly sufficient for a growth of protective vegetation. These areas are often major sources of sediment and they may support little if any productive use. Expenditures for conservation in these areas must be justified largely by downstream benefits.

In the Plains portion of the Basin, additional water is needed for full agricultural production. Moisture conservation practices are of major importance. In the past, development of irrigation has been confined to the western or drier portion of the Plains, except in the Platte Valley where favorable circumstances have encouraged development in the eastern Plains. Present plans would develop a large amount of irrigation in the eastern Plains. In this area, rainfall is sufficient for full production in some years. In other years, however, precipitation is so low or poorly distributed that crop yields are severely reduced. This variable rainfall may be contrasted to the more arid condition where production almost entirely depends upon irrigation. Many economic problems are being encountered in designing irrigation systems to meet these fluctuating needs. Cost of irrigation development in the Plains is proving to be high. It has been partly justified on the basis that it will add stability to the agriculture of the entire area. Studies indicate that existing irrigation projects have added little to the stability of adjacent dryland areas except in cases where dry and irrigated lands are in the same operating unit. Further investigation is needed to discover ways of organizing irrigation so that it will contribute the maximum to stabilizing surrounding areas.

In the eastern, more humid portion of the Missouri Basin, precipitation is usually sufficient for crop production. Generally, there is an excess of water and runoff is high being exceeded only by the mountainous areas. Under the humid conditions in this area the water yield has no value for irrigation. The problem is to make maximum use of water for production where it falls and to dispose of the excess without erosion or flood damage to the land. Conservation and development of the resources of this humid area are important parts of the Missouri Basin program. The area contains about 50 percent of the farm people in the Basin and in 1944 it produced about 45 percent of the farm income. The area is subject

to high flood, erosion, and sediment damages, and is the major contributor to floods in the lower portion of the Missouri River.

For the entire river basin, then, the problem of maximizing benefits involves, first, the use and control of water for watershed protection purposes, for production on the land where it falls, and the delivery to stream channels of excess water in most usable form without damage to land; second, the diversion of water from stream channels for domestic, industrial, and irrigation use; third, the regulation and use of streams for power, navigation, recreation and other purposes; and fourth, protection of bottom lands and improvements from floods.

From a simple reporting on single-purpose projects, Federal cost-benefit feasibility analysis has developed over the years to a rather complex analysis of these multiple purposes. For several reasons, the present procedure falls short of what might be desired to guide Federal investment policy in river basin development. Time and funds do not always permit full exploration of alternative possibilities of development. Major purposes of projects are usually influenced by institutional factors. Development agencies are charged with specific primary objectives, and other objectives may be given only incidental consideration and treated as byproducts of the primary purpose. There is a tendency to average project costs and benefits for the whole river basin which results in the most feasible projects carrying the least feasible and provides no basis for priority of Federal investments. Finally, when several agencies are making project cost-benefits investigations, uniformity in methods used is desirable so that the various analyses might be combined into an appraisal of cost-benefits for all developments in the Basin.

THE ROLE OF THE AGRICULTURAL ECONOMISTS IN THE FORMULATION OF LAND USE POLICIES IN RIVER BASINS*

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I THINK it was Benjamin Harrison who, in a moment of exasperation at a flood control hearing said: "Man and water have one great trait in common, they both tend to run down hill." At that time Harrison was serving as the civilian member of the newly created Mississippi River Commission and was busy preparing a "minority report," a task which always has an air of futility about it and which doubtless prompted this singularly cynical remark. Whatever the truth in the remark, it serves as a useful reminder that the concept of the river basin, as used in our discussion today, is political as well as geographic and that it may be the mission of the agricultural economist, working with other men of science and politics, to prevent if possible the too rapid descent of man as well as water.

As it has gradually come to be general knowledge that the complicated relations between man and nature (resources) cannot be safely left to chance, so has it become the business and the duty of the agricultural economist to be available with facts and considered opinions on the complex physio-economic problems communities and governments face in trying to bring about harmonious relations between use and conservation of resources and at the same time maintain the cherished freedoms of individual initiative and decision. In other words, what individuals and governments dealing with fundamental questions of adjustments in land use want to know is how best to go about toward getting the land use changes so evidently needed (some of which are quite drastic) without disturbing in a fundamental way the system of rights, freedoms, and forms which characterize their particular society and form of government. This is not going to be easy. Indeed, the linking of the agricultural economist to problems of man-land relations arising in the river basins of the world in indicative of pending crisis therein. The practical man has stumbled; he must be assisted. He cannot be left to roll down hill.

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What are we agricultural economists to advise in this difficult case of how to bring about desired, and urgently required, land use adjustments in the major river basins? What will we put in the economic brief, now that we have become, like lawyers, writers of briefs?

The economist has in this case, I believe, a dual responsibility: First, in helping in the development and formulation of the land use program, and second in helping to put the program in operation. In practice, of course, the work rarely ever falls into these two distinct phases, as formation and establishment of land policy move more or less simultaneously. There is a two-way reaction between what is planned and what is accomplished. Nevertheless, it is helpful to think separately on these two phases of the economist's role in land use affairs. Let us remark now upon the first phase of the economist's task.

First, we will have to go very slow in recommending that land use matters be handled by legislative decrees, for we know that like the title to land, questions of land use are difficult to establish by legislating. Besides, we are interested in the formation of land use policies *in* the river basins, not *for* the basins. With this in mind, it appears that success in getting individual participation rests upon a favorable relation in the area concerned to the three following aspects of the proposed land use program: (1) The knowledge required to practice the program; (2) ability to practice the program; and (3) willingness to practice the program. Clearly the economist is going to have some knowledge and some pretty definite data on each of these aspects for the basin concerned before any definite recommendations on land use can be made.

I would like to make some observations relative to the various types of land use programs with which economists are asked to deal. In appraising proposed land use policies and programs, the practical economist will endeavor to determine at the outset to what degree the program is designed to bring about a more profitable agriculture on individual farms of the area involved, and therefore charged with strong short-run appeal, and to what degree it is designed to serve the more distant and less personal ends of conservation or of various types of public resource development, wildlife, water-power, recreation, etc. In appraising the long-run programs in terms of the response they will receive locally and in terms of the prospects for their ultimate accomplishment, it may

be well to recall the remark attributed to Lord Keynes: "That in the long run we are all dead." This may sound harsh, selfish, and short-sighted, but I wish particularly to point out here that it is the duty of the agricultural economist in his appraisal of land use programs and policies to protect the individual and the community from those programs that appear to be unduly weighted toward the long run or produce benefits so remote from the individual that there can be no clear motive for active individual economic participation. There is no intention here to minimize the importance of certain long-run benefits, but only to say that unless the land use program has some short-run benefits, the long-run aspects are not likely to be realized.

It might be well to mention here that land use programs and land use policies and ideas in the outline stage are almost a dime a dozen. Every chamber of commerce, every state board of development, every religious order, to say nothing of the many governmental agenices, has one or more outlines of land use plans. These programs range all the way from weird schemes for state and local soil-mineralization services to proposals for wilderness areas. Frequently enough some of the least promising ideas are backed by organizations with considerable money and skilled publicity departments. In the alluvial valley of the lower Mississippi River alone, there are more than 60 organized groups with one or more programs or ideas relating to the utilization of land resources. It would not surprise me that one of the big jobs of the agricultural economist of the near future will be that of protecting agricultural areas from adoption of faulty schemes of promoted land use adjustment. Whether irrigation work can be justified on the basis that they will *stabilize* the agriculture of an area is a question which economists may be asked to work on.

At any rate, the first step in appraising land use policies and programs is to find out where the alleged benefits are to fall. Once this is known, and it is not an easy thing to know in many cases, there is some basis for beginning an assessement of the costs. It is thus in the role of bookkeeper between public and private benefits and public and private payments toward cost that the agricultural economist will render part of his service. In cases where benefits are largely public in character, decisions on the program lie largely in the field of political economy, which we shall not enter in this brief discussion. Where individual benefits, as well as public, are

definitely present, and it is hoped that most of our agricultural programs will be of this nature, the task of the economist relates to the three above-mentioned points (knowledge, ability, willingness) which are determining factors in the success with which individuals can participate.

The popular, and sometimes the professional, discussions of land problems as they may be attacked under the direction of various types of regional authorities, have often been charged with a certain magic that one is asked to accept as a natural product of basin-wide or regional cooperation. I won't dwell on this point except to say that I, for one, have not been able to discover all the energies and benefits that are supposed to follow from the creation of regional bodies or from other types of basin-wide planning. The available economic literature, and it is pitifully little, relating to the TVA fails to give any satisfactory picture of the economies of this vast undertaking and whether the benefits, and there have been many, from the operation of this Authority are unique; and if so, in what way and at what cost.[1] I am thinking here of the agricultural program.

Though the economist will have an important role in helping form the general outlines of land use policy and in the establishment of over-all administrative machinery for the bringing about of desired resource uses, some of the most valuable work of the agricultural economic staff will be in the development of strategies applicable to the numerous local areas where the proposed program goes into operation. At this stage of the plan there must be more than general knowledge. There must be specific knowledge of the economic and social characters of the types of land use actually practiced and those proposed. There must be clear knowledge of the cost (social and economic) of transition operations.

When the State is to bear part of the cost of transition, as in land clearing and land drainage programs, it is essential to the development of a sound program of aid to have exact knowledge of the steps in the transition process and the cost of each. We know that government payments for land drainage and land clearing could have been made much more effective, as a means of aiding farmers in desirable land use adjustments, if agriculturel econom-

[1] The fact that economic studies of the TVA have not been developed sufficiently to show the benefits to be derived from the authority should not lead to the conclusion that benefits are not present.

ists had been able to provide some practical ideas of the amounts required by areas to make constructive headway in these aspects of redesigning the farm business. The idea of a uniform payment is certainly sinking to sea level as far as the economist's function is concerned.

In getting the knowledge, the ability, and the willingness synchronized, the agricultural economist will be called on to solve some very different problems. Often he will have to fall back on his native wits. I fear that there are no textbooks to guide him. He will soon find that the much talked about combination of enterprises yielding maximum profit is likely not to be a combination at all but rather a planting of the largest possible acreage of that single crop yielding the highest net returns per acre. Some of my farmer friends have just lately been putting their agricultural operations through the process of undiversification after foolishly listening several years ago to certain conservation lectures. Conservation must pay, and in these days it must pay in cash, not in the intangible (but none the less valuable) rewards certain older societies have sometimes been able to establish.

There is really not time to explore the details of the economist's role in the formation and establishment of land use policies in the river basins. It is literally a detailed task. There are no short cuts, no easy, simple ways to explain what he must do. Knowledge of regional, area, and individual farm problems are required.

It is certain that some very interesting social and economic situations will be faced in attempting to bring about desirable land uses and at the same time maintain a semblance of order and harmony in other aspects of rural life. For example, in the last session of the Mississippi Legislature a bill was introduced which proposed that certain lands in the Delta, or lowlands, be assessed special taxes to be paid to certain hill counties where flood control reservoirs to protect the Delta were being built, causing great reduction in the taxable property.

The economist will have to help keep the peace.

ROUNDTABLE ON COTTON MARKETING

Chairman: Lippert S. Ellis, University of Arkansas

COTTON MECHANIZATION: ITS PROBABLE INFLUENCE ON MARKETING*

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THE impacts of cotton mechanization, particularly the mechanization of harvesting, will be important from the standpoint of marketing. Appraisal of these impacts lends itself to the following considerations: (1) modifications in the operation of marketing agencies, (2) changes in the performance of marketing functions, and (3) broad aspects of mechanization.

Modifications in the Operation of Marketing Agencies

The operations of marketing agencies are affected by the trend toward cotton mechanization. The points covered in this discussion include: (1) cotton gins, (2) cooperatives, and (3) location of agencies.[1]

Cotton gins. Mechanized harvesting is shifting a large share of the responsibility for maintenance of cotton quality from the grower to the gin operator. In response to such factors as good roads and increased truck transportation, and coupled with the influence of machine harvesting, the trend is away from the $5,000 or $10,000 gins. In their place is the modern plant complete with up-to-date cleaning and drying equipment and with a capital investment ranging from $40,000 to $80,000. It is reported, for instance, that $1,500,000 is being spent in North Carolina to modernize gins for the 1948 season. Such gins call for higher calibre management. A $150 a month man may well keep a small gin going but such cheap management could prove expensive if entrusted with the operation of a $60,000 establishment.

Gin operators in many parts of the Southeast have given little attention to ginning costs or to improved methods of operation. Ginning often has been looked upon largely as a means of procuring

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

[1] It also is recognized that handling operations in modern warehouses have become mechanized in recent years.

cottonseed at very favorable prices. Another factor that has limited the efficiency of gin operation and the effectiveness of serving farmers is the practice engaged in by many gin operators whereby they derive a large share of their income from buying and selling cotton on a speculative basis. There is reason to believe, however, that modern gins will compete largely on the basis of cost and service to patrons.

Important from the standpoint of ginning is the influence of mechanical harvesting on quality. General experience indicates that when machine harvesting is first tried, quality often is two and sometimes three grades lower than hand picked cotton. With the installation of better ginning machinery and with greater care in harvesting, this differential usually has been cut to one or, at the most, two grades. Adequate grade comparisons for machine harvested and hand picked cotton were not available for North Carolina in 1947. Preliminary findings, however, indicate a difference of approximately 6 cents per pound in the loan rate for machine stripped as compared with hand picked cotton.[2] It is to be expected that an increase in mechanical harvesting will result in higher ginning costs. Another consideration relates to the fact that unless the quality of mechanically ginned cotton is improved, premiums for hand picked cotton may become larger.

Cooperatives. There is little indication that the mechanization of harvesting has had much influence on the operation of cotton marketing cooperatives. There are possibilities, however, for increased service to patrons that aggressive associations might consider. One possibility is the establishment of modern, large-scale gins, designed to handle machine harvested cotton. Many cooperative gins, especially in the West, have pioneered in the installation of modern equipment and in the improvement of services for members. To furnish the leadership needed to run modern gins and related marketing activities, cooperatives might band together for such purposes as employing high calibre management, operating oil mills, and establishing central accounting systems.

With increased emphasis on farm machinery and other farm supplies, a reasonable increase could be expected in the cooperative farm supply business in cotton areas as farmers increase their capi-

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[2] Preliminary findings of a study of cotton mechanization in North Carolina conducted by Mr. Gwyn Sutherland, Agricultural Economist, USDA.

tal resources. Such development might take place through separate supply associations or through integration of operating activities on the part of cotton marketing cooperatives.

Another possibility for cooperative associations is that of establishing a harvesting service for their patrons, particularly for those patrons having small holdings and not able to purchase and operate their own machines. It should be emphasized that while such developments are likely, whether they will be undertaken on a cooperative or on a private basis will depend largely on imagination and ability of cooperative management to render a pace-setting service for members. Some of these developments also might come about as a result of civic action. In 1946, for instance, county commissioners in one North Carolina county tried to buy three cotton pickers to alleviate the shortage of picking labor.

In any event, cooperative associations can make important contributions by conducting aggressive educational programs designed to acquaint members with the implications of mechanized harvesting as it relates to marketing and production practices.

Location of marketing agencies. It generally is agreed that mechanization of cotton harvesting will reduce costs of production. In the long run, it can be expected that most of the resulting reduction will be passed on to mills and eventually to consumers. This will mean a relatively lower farm price for cotton. In its wake will be a shift from the small, inefficient, non-mechanized farms to large units lending themselves to complete mechanization. This shift will cause changes in production within areas and between states. In some places there will be excess capacity in gins and warehouses and in some cotton buying agencies may have to restrict, discontinue, or shift the location of their business operations. In areas experiencing an increase in cotton production just the opposite events may be expected.

Changes in Marketing Functions

Marketing functions will be influenced in numerous ways by the mechanization of cotton harvesting. Under normal conditions of weather, the picking season can be expected to be shorter. As a result, cotton will move from the farm in less time. Furthermore, the cotton farmer usually sells his crop (cotton and cottonseed) at the time of ginning. To the extent that mechanization contributes to a shorter harvesting period, problems of transportation will be

intensified, burdens on warehousing will be increased, and additional demands on financial institutions will be made.[3]

Other marketing functions that are likely to be influenced by mechanized harvesting are selling practices and buying operations.

Selling practices. Most cotton commonly is sold by farmers on the notorious "hog-round" basis.

Failure of farmers to sell on the basis of price differentials that reflect quality has long been one of the curses of the trade. With mechanical picking, however, there is a possibility that buyers will be more inclined to purchase from farmers on a grade basis. Because of the differentials that are likely to prevail for grades, mechanical picking may serve as an entering wedge in the establishment of a pricing system that goes further in reflecting the quality produced. Such a development in itself might go a long way in counter-balancing the lower returns resulting from reductions in quality attributed to mechanical harvesting.

Mill buying operations. A considerable proportion of the cotton produced in North Carolina and in the Southeast is sold direct to mill buyers. Some of the gins from which mechanically picked cotton is available report that these buyers at times have followed the practice of discounting the price of this cotton one or two cents a pound. Since this cotton already has been graded and as such reflects quality, this practice has no economic justification.

Broad Aspects of Mechanization

On the basis of the preceding discussion, the two following observations are made:

1. Mechanized harvesting of cotton, with its possibilities of reducing production costs, has important implications from the standpoint of marketing agencies and cotton producers. It offers an opportunity for halting the trend toward pricing ourselves out of foreign markets. It also should reduce price competition on domestic markets from such items as rayon, nylon, and fibre glass.

2. Machine harvesting eventually will make possible the complete mechanization of production practices in a large part of the

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[3] Quality also may be influenced because of the time of harvesting. Machine harvesting usually starts two to four weeks after hand picking commences. Nevertheless, machine harvesting usually is completed before hand picking. Obviously quality is influenced by weather prevailing at different parts of the harvesting season and by the time required to complete harvesting.

cotton belt. Until this key operation was mechanized, there was little incentive for farmers to get away from the one- and two-mule economy of the cotton belt since the mechanization of cultivation, spraying or dusting, chopping, and fertilizing operations would only contribute to further unemployment of people needed for picking. Larger farms and shifts within and between producing areas can be expected. This will require greater ability on the part of farm managers and operators.[4] The person who trudges behind a mule up and down the cotton row may be ill suited to operate a $7,500 cotton picker. Additional premiums will go to those who add capital wisely, who are willing to study the performance of various kinds of marketing agencies, and who have ability to interpret and use economic facts as they relate to the establishment of sound sales policies.

3. Mechanized harvesting of cotton will influence the operation of ginning agencies. These operations will be conducted in large-scale, modern establishments which will require competent management. Cooperative associations have the opportunity of integrating supply service and marketing operations and of expanding their services for farmers. The location and extent of business for all types of marketing agencies serving cotton producers will be influenced by shifts within and between production areas.

4. Concentration of harvesting during shorter periods will call for greater skills in the performance of such marketing functions as transporting, warehousing, and financing.

5. Indications are that greater emphasis will be given to the development of a pricing system which adequately reflects variations in quality and which will have broad application in the selling methods of producers and in the buying practices of dealers, cotton merchants, and mill operators.

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[4] The ability of management also has a bearing on the quantity of cotton left in the field after mechanical harvesting. This is important in determining the efficiency of machine picking. While our experience in North Carolina is limited and while our findings are preliminary, a summary of four tests of mechanical stripping shows that 7.9 percent of the cotton was left in the field. The average ranged from 6.5 percent to 11.3 percent. Loss from mechanical picking was somewhat higher, averaging 14 percent and ranging from 11.8 percent to 16 percent. When test lots were immediately rerun, losses were cut to 4.4 percent, ranging from 2.6 percent to 5.3 percent. (Op. cit. 1)

RESEARCH IN COTTON MARKETING*

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IN TERMS of research accomplished in cotton marketing, the studies of price-quality relations in the local cotton market stand out in bold relief. The southern agricultural experiment stations have been severely criticized for the apparent duplications involved as these studies were made in all the principal cotton states. But the maladjustments in the local markets were of such serious proportions as to justify much of this repetition.

Anyone familiar with the cotton problem is aware of the fact that interest in marketing on the part of growers has been spasmodic, emerging only during periods of low starvation prices. The emphasis then has been primarily on ways and means of raising the price whether by holding the product off the market, or by "feeding" the market, or by out-and-out price fixing, or by parity price standards. Very little interest has been manifested in the cost and efficiency of the cotton marketing system. But at times growers have expressed dissatisfaction with the relatively small share they receive of the consumers' cotton dollar.

In view of the sudden major emphasis on marketing in the activities of State and Federal research agencies, market researchers face a trying situation. It should be patent to everyone that the Congress, the general public and agricultural producers are all expecting quick tangible results to flow from all marketing studies undertaken. Unhappily, expectations and accomplishments for the years immediately ahead may, in some instances, be rather widely separated.

Cotton Marketing

Research workers in cotton marketing are fully aware of their responsibilities. How best to make good on the assignments which must be accepted is the burning question of the hour. It should be evident that a program contemplating a simultaneous attack on the whole marketing front from cotton grower to ultimate consumer would be indiscriminate and could lead to much fruitless and misdirected effort. To be sure, research must be approached from the standpoint of the problems involved in cotton marketing.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

A listing of such problems is but a beginning. In the main, at least two tests need to be applied in selecting the fields to be investigated: (1) the problems must be significant and (2) the problems must be such that the results of investigation may be put to practical use without too much resistance.

Among the various aspects of cotton marketing particularly well suited for study, three may be singled out: (1) the price-quality relations in local cotton markets; (2) quality characteristics of the lint best suited to the various uses of cotton; and (3) ginning problems which may arise from a more general adoption of mechanical harvesting of cotton.

Price-Quality Relations in Local Markets

Significant changes have occurred since the price-quality study was made. Classing service is now very generally available to growers which was not the case 15 to 20 years ago. This means that growers can now readily ascertain the quality of their cotton according to U. S. Standards. In recent years, great strides have been made in the promotion of one-variety communities. As a consequence greater uniformity of quality in the gin community has been attained. The question can then very properly be raised as to whether or not growers of one-variety cotton with Smith-Doxey classing service are obtaining prices for their cotton commensurate with quality. Significantly the promotion of one-variety cotton in at least one of the states is based solely on the higher yields of lint per acre of the chosen variety. Nothing is said whatsoever about the possibilities of premiums to growers as a result of the more desirable characteristics of the selected variety. This would seem to be an off-hand admission that growers of one-variety cotton are not generally receiving the market premiums for superior quality.

Then again, ideas of quality have changed greatly. Earlier, quality was defined in terms of grade and staple length with a troublesome left-over parading under the designation of "character." Even-running lots were thought of as being governed by lint of like grade and staple length. This is now less and less the case. Much progress has been made in ascertaining numerous quality characteristics of significance to spinners and considerable headway has been made in developing instruments for measuring them. Chief among these quality attributes are: uniformity of fiber; tensile strength; fineness; and maturity. Strangely enough growers no sooner obtained classing service than it became appar-

ent that other quality characteristics than grade and staple length must also be ascertained. Thus the Smith-Doxey classing service only partly fulfills present requirements in the task of quality determination. Obviously proper price-quality relations in the farmers' cotton market now involve more than full premiums, or discounts, for grade and staple length.

A significant problem for research in the local cotton market is that of determining the sensitivity of farm prices to quality characteristics in their broader scope. A second important problem is that of ascertaining to what degree the quality characteristics of importance to the spinner may be made the basis of trading in the local market; this involves the nature of the reorganization needed in the local market to facilitate suitable trading practices. It should be patent that growers will continue to be indifferent to the quality of the cotton they produce so long as local cotton prices fail to reflect premiums and discounts in terms of the quality of the cotton offered for sale in the local market.

Quality Requirements of Mills

Cotton is put to almost innumerable uses. Desirable quality characteristics suitable to these different uses vary widely. Cotton as a raw material in demand by manufacturers is not a matter of a few simple attributes but rather a complexity of attributes. Thus no one type or variety of cotton is best fitted to all uses. By and large cotton growers are quite unaware of the wide range in quality characteristics in demand. Mill requirements from the standpoint of cotton growers are a virgin field for study. This aspect of the cotton problem needs careful probing before an intellingent variety program can be worked out for growers in all sections of the cotton belt.

Quality tests other than grade and staple length have been developed and are being applied principally in the laboratory. What is now needed is to determine to what degree the laboratory tests stand up under actual mill operating conditions. That is, to what extent can the laboratory methods of quality determination be accepted by the mill operator.

Mechanical Harvesting as Related to Ginning

The relation of ginning capacity to output of cotton takes on a new aspect with an increasing adoption of mechanical harvesting. For the past forty years ginning capacity in Texas has been adjust-

ing itself to cotton output in such a manner that the total crop could have been ginned in 26 days of full 12-hour run per day. During the period 1930–1942, cost analyses in Texas indicate such a relation between capacity and output of cotton that, on the average, ginners break even on their operations. That is, income and costs are equal. The low volume of Texas gins means high fixed costs. Even a relatively slight increase in volume above that of the break even would significantly reduce costs per bale. The shortness of the ginning session and the insistence of growers on prompt service are primarily responsible for the relative over-capacity.

An increase in the number of days of full run ginning rather than a lengthening of the ginning period could materially reduce the gin capacity needed. Such objective could be attained through the addition of a seed cotton house to ginning equipment. During days of harvesting beyond ginning capacity, the surplus seed cotton could be stored in the cotton house; during days of light receipts, the current run could be supplemented by ginnings out of storage stocks of seed cotton; and during days when weather conditions do not permit harvesting, the gin could operate on stocks in storage. Thus the gin with a sizable cotton house would be in position to increase significantly its volume of ginning without in any way jeopardizing its service to patrons. As a consequence the number of gins could be reduced or the size of gins could be reduced. Either adjustment should be a factor in reducing ginning costs.

As an increasing number of growers turn to mechanical harvesting, a considerable strain on ginning capacity over short periods is bound to occur. In view of normal ginning capacity, the rate of ginning can be stepped up considerably with present capacity. To the extent, however, that the demand for ginning service may not be fully met over short periods, two alternatives present themselves: (1) ginning capacity could be increased or (2) seed cotton houses could be provided for storing receipts above daily capacity. Increasing ginning capacity would mean higher ginning costs to growers. Perhaps the most feasible adjustment would be attained through the adding of cotton houses.

The ascertaining of the advantages and disadvantages of the seed cotton house requires considerable research. The grower himself might furnish the storage facilities. This might involve a testing of various types of facilities from temporary structures to permanent warehouses. Even trailers with detachable running gears

might merit consideration. The matter of handling the seed cotton, cleaning equipment, preservation of quality, and costs would all be involved. In the study of farm storage the starting point would be that of acquiring as complete information as possible from growers with farm storage experience. One feature of this study, no doubt, would be the designing of farm storage facilities.

The operation of the seed cotton house at the gin is an untouched field from the standpoint of research. As a first step, the experiences that ginners have had with seed cotton houses would need to be ascertained. One of the most significant aspects of the study would be that of determining relative costs of a sizable cotton house with cleaning and drying equipment and of a second complete gin plant. The attitude of growers towards the use of the cotton house is most important. How insistent is the grower on waiting in line for delayed ginning rather than accepting prompt unloading into the cotton house? How would the growers react to a drop in prices of lint and cottonseed from the time of putting the seed cotton in the house and later ginning? Would it be necessary to provide hedging service as protection against possible price declines?

It would seem that the three fields proposed above would qualify from the standpoint of the significance of the problems to be studied and of the feasibility of practical application of the findings.

ROUNDTABLE ON FORMULA PRICING OF CLASS I MILK UNDER MARKET ORDERS

Chairman: T. M. Adams, University of Vermont

FORMULA PRICING OF CLASS I MILK UNDER MARKET ORDERS*

WM. C. WELDEN
H. P. Hood & Sons, Inc.

EFFORTS to stabilize our agricultural economy in recent years have involved a substantial amount of commodity price-fixing by governmental agencies. Success in the eyes of the public has been relatively elusive in this job. This has sharpened the interests of economists in the subject of administered prices and has made each new line of effort a topic of lively discussion.

Class I or fluid milk has been one of the main fields of price-fixing activity. It provides for several reasons one of the most interesting to discuss and study. Half or more of the States and the Federal Government have been fixing minimum Class I milk prices in selected markets for the last 15 years. Today probably 75 percent of the fluid milk sold in the metropolitan population areas of the nation is sold at minimum Class I prices established by a State or Federal order. Public interest has been intense because of the importance of milk in the diet and in the budget. Farmers and milk dealers have been especially interested because the minimum prices fixed have usually been the prevailing prices paid. Milk price-making forces are fairly complex because while sanitary rules, perishability, and bulkiness tend to localize each major city as a market, the interchangeability of milk is great enough to require a fairly stable relationship among markets and among the various dairy products. Pricing procedures and pricing mechanisms under these milk marketing orders have varied considerably from time to time and from market to market, even among the 30 or so Federal market orders issued pursuant to the Agricultural Marketing Agreement Act of 1937.

These facts explain the interest shown in the new pricing plan adopted on April 1, 1948, for the Boston market.[1] This plan was

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

[1] Federal Milk Order No. 4 for the Greater Boston Marketing Area, Amendment No. 6 issued March 25, 1948.

also adopted for the adjacent Federal order markets of Fall River and Lowell-Lawrence. The main features of this Boston formula were developed during the summer of 1947 by a committee appointed by the Administrator of the Boston Order. The committee included 3 professors in Agricultural Economics from New England colleges, 2 economists from local farmers' cooperative associations, 2 economists from local milk distributors, and one economist from the Administrator's office. The Committee Report[2] formed the basis for amendments made to the Federal orders to incorporate the new pricing program.

Recent pricing and marketing conditions in Boston provided very favorable conditions for the consideration and acceptance of a new pricing program. War-time prices affected the seasonality of market receipts and served to move supply and demand in opposite directions more frequently than otherwise. A price formula relating Class I prices to market quotations for butter and skim milk powder adopted soon after the war proved to be very unstable. It had to be altered by suspensions with little advance notice in order to prevent serious anomalies, and did little to help correct basic supply conditions. The longer run history of Class I milk prices in Boston provided several periods when receipts and sales trends made it rather obvious that mistakes in prices had been made, and thus provided a good basis for comparison with the prices which would have prevailed under the new formula.

The first job of the Committee was to develop a set of objectives to serve as broad standards for its work. These are indicated generally in the Agricultural Marketing Agreement Act of 1937 under which the orders are issued. These objectives were:

1. An adequate supply of milk at all seasons, defined to include a reserve of 20 percent above actual sales in the months of shortest supply.
2. A more reasonable pattern of seasonality in market receipts than recent years.
3. Orderly and timely price changes in line with changing supply and demand conditions.
4. Prices and incomes for dairymen in line with general economic conditions.

In order to accomplish these objectives it seemed clear that the Class I price should be made to change automatically as soon as

[2] A Recommended Basis of Pricing Class I Milk in the Boston Market, September 1947, Market Administrator, 80 Federal Street, Boston 10, Mass.

specified conditions changed, rather than be established at some fixed level which level could be changed only after a public hearing and an approval vote from producers. Although public hearings appear to have some special appeal as legal instruments, and fixed prices seem more simple, more direct, and represent a firmer guarantee to farmers, these advantages are questionable today. Public hearings have become slow and cumbersome, often promote intemperate, emotional, and destructive discussions, and in the case of milk prices, mean that each price change, whether up or down, must involve a new producer vote of approval. Also, when economic conditions are changing rapidly, each fixed price must be based on conditions already well past or on an uncertain forecast of the future. In other words, the objective of orderly and timely price changes is very difficult to achieve.

It should be possible to make automatic or formula prices for Class I milk as logical and as understandable to dairy farmers as fixed or pegged prices. Sound formula prices provide an infinitely greater guarantee of security to farmers and of fair and reasonable prices to the public than prices fixed at any specific level for an advance period. It is most important to recognize also that if an obvious defect develops in the formula or if it needs to be amended temporarily to meet a special local situation, then a formula can be amended after a public hearing just as quickly and just as easily as a price level can be changed in a fixed-price type of order. The formula, therefore, is in no respect more fixed or rigid than a pegged price, but does guarantee timely price changes in the interim between public hearings.

Briefly the new Boston formula provides that the Class I milk price shall vary in accordance with changes in a composite formula index calculated on a 1925–29 base. This index is the simple average of (a) the latest monthly index of all wholesale commodity prices in the United States as published by the Bureau of Labor Statistics, (b) the average of the last three monthly indices of Department Store Sales in New England as published by the Federal Reserve Bank, and (c) a joint index of the latest available costs for farm labor and for dairy feeds in New England as calculated by the Market Administrator each month from regularly published figures. The basic Class I price varies in intervals of 22 cents per 100 pounds in accordance with bracketed changes in this composite formula index.

Super-imposed on this basic price structure is a seasonal pattern which provides a price 44 cents per 100 pounds above the basic level in the 4th calendar quarter, and 44 cents below the basic level in the 2nd calendar quarter each year. An additional seasonal safeguard prevents any price increase from March through June and any price drop from September through December each year.

Also super-imposed on the basic price is a provision whereby the Class I price is automatically lower by 44 cents as soon as and so long as the percentage of surplus in the market for the most recent 12 months is above the critical level defined as 41 percent. Similarly the critical level on the low side is 33 percent, which calls for a price 44 cents higher than otherwise provided so long as the shortage continues. Only such part of this supply-demand adjustment can operate as will not cause a price change from the same month a year earlier of more than 88 cents per 100 pounds.

The three basic factors in the formula are designed to reflect local supply, local demand, and general economic conditions. The three are given equal weight for reasons of simplicity and logic, and also because the results met the empirical test. So far this has had very popular appeal. With a relatively inelastic demand and with delayed if not inelastic supply responses, this equal weighting might not have been necessary to meet some of the objectives, but it is fair and reasonable and is safeguarded by the supply-demand adjustment. Also, the weightings might not have been equal if the results of detailed statistical and correlation analysis of factors affecting the Class I price had been adopted. The objectives called, however, for a more general empirical analysis with logic and equity and sound public policy as the standards.

The wholesale price level represents a basic tie-in with the whole economy of the nation, measuring the level of general economic conditions as reflected on a composite basis in the primary wholesale markets. In any analysis of factors affecting Class I prices, the first step would probably be to deflate the price series by this wholesale price level, just as for resale price analysis the series might first be deflated by the consumer price index.

Grain and labor costs reflect the main cash cost items in milk production in New England. Changes in such costs may not forecast precisely changes in the supply on a short-run basis, but a stable relationship between these costs and milk prices is necessary to a stable milk supply. Changes in these costs, also, must be important

factors in the timing and degree of milk price changes if such milk prices are to bring economic stability to the farmer. Total production costs are more difficult to measure. Also, they are partly reflected by the wholesale price index.

The demand factor used in this new pricing formula has probably created more comment than any other factor. The index of New England Department Store Sales was selected as a measure of changes in New England consumer purchasing power. It comes closer to measuring changes in the disposable income than any other factor available—payrolls, industrial activity, or others. It is available monthly, whereas actual income figures regionally are available only on an annual basis and are not available on an annual basis until August of the following year.

There is available, of course, a current monthly figure on the amount spent for milk. To use such a figure as the demand factor, however, would be to flaunt public interest and potentially at least exploit the inelastic demand for milk. It would be comparable to using the farm value of all the milk produced as an index of the supply part of a pricing arrangement. It would be circular reasoning of the worst type. If the supply were inelastic this value would change only after a price change rather than before. The same would be true of the money spent for milk if demand were inelastic.

This index of consumer purchasing power does not necessarily measure or forecast in any precise or accurate manner changes in the sales of milk at various prices. This need not be its restricted purpose, however, in the pricing formula. It is the key factor on the demand side, fundamentally affecting the price consumers will pay for milk and the amount they will purchase, and thus the basic factor in the reasonableness of milk prices from a public interest standpoint. The formula recognizes that changes in income-price relationships will affect sales, just as changes in cost-price ratios will affect production, and that sound orderly prices require a balanced relationship to both incomes and costs. This balancing job may change in character if there is a basic change in milk using habits or in the techniques of milk production. Any formula may need basic changes accordingly.

The special seasonal pricing provisions are designed to encourage a return to the more normal pre-war seasonal pattern of milk production. Short-season market receipts in Boston in recent years have been only about half of flush season receipts, as compared with

60 to 65 percent before the war. Emergency imports from as far west as Minnesota have been necessary in four of the last five short seasons in order to meet sales needs, and in two of these four years milk sales actually had to be restricted because the milk could not be obtained. Last year's imports were close to 20 million pounds. Yet in June this year Class I sales were less than 50 percent of market receipts.

The special supply-demand adjustment is a basic safeguard and an integral part of the entire program. The critical limits of 41 and 33 percent surplus on an annual basis are designed to correspond to 25 and 15 percent necessary operating reserve in the short production months. The mid-point of 37 percent annually would normally provide a 20 percent operating reserve to cover day to day fluctuations and thus insure an adequate supply in the shortest month of production.

On an empirical test, the new formula would have given slightly higher prices than actually prevailed in 1924 and 1925. Formula prices would have been lower in 1929 and 1930, but would not have fallen as sharply or to as low a point in 1931, 1932, and 1933. Formula prices would have been lower again in 1938, 1939, and 1940. The war years do not furnish a good comparison base because the wholesale price index was so much affected by OPA ceilings. The formula would have given a lower price in 1946 but a higher price in 1947. In retrospect it seems clear that the formula would have prevented some of the more obvious price maladjustments of the past in Boston.

The principal novel features of the Boston milk price formula are (1) the use of a demand index as one of the basic parts of the formula, (2) the provision for automatic price adjustments when receipts and sales get out of balance, and (3) the omission of market price quotations for any manufactured dairy product as a basic part of the formula. These innovations have been variously praised and criticized. Time and experience, of course, can supply the only reliable judgment as to the soundness of these new features of the Boston formula both as a matter of principle and in respect to the details.

It should be stated that the price committee, the dairy industry in New England, and the Department of Agriculture are open-minded on the entire formula and these innovations. There is a strong feeling that the new pricing plan is sufficiently sound to

warrant a real trial before it is changed in any basic sense. This seems to be necessary in order to build confidence among producers and consumers, and more important, is necessary in order to provide a real test of the adequacy of the formula.

Some modifications in the Boston formula may be needed in order to establish the appropriate relationship with milk prices in nearby markets. In order to accomplish this it may be desirable to try to develop a different or broader measure of demand. It might be possible, for example, to have the Department of Commerce develop a direct measure of regional income on a monthly or quarterly basis. Again, it might be feasible to develop and use a Department Store Sales index for the entire Northeast rather than for each Federal Reserve District. It should be recognized also on this inter-market problem, that when supplies are more normal, it may be more desirable to recognize local supply and demand conditions promptly than to follow a rigid price relationship with adjacent markets.

A composite of manufacturing milk prices might be used as an additional factor in the index or a partial substitute for the wholesale price index. Before the war the wholesale prices for some of the principal manufactured dairy products such as butter seemed to furnish a good broad index of changes in supply-demand conditions for all dairy products and in general economic conditions. This basic relationship is much less evident since the war. Some of the prices have been erratic, and there is evidence of changes in the character of the demand for some of these products. There seems to be, temporarily at least, much less reason for using butter, for example, as a basic guide to fluid milk prices than might have been true before 1940.

The supply-demand adjustment is most novel, of course, and is designed as insurance against shortages or over-production, as well as a means of helping to correct any deficiencies which the formula may contain. Here again the detailed application of the supply-demand adjustment must be looked upon as experimental. Both the amount and the timing of the price adjustments based on the amount of surplus in the market will need to be studied very carefully. This part of the formula could not be given too rigid an empirical test because obviously if prices had been different in past years, market receipts and sales might also have been different.

To the industry in New England one of the most encouraging

aspects of the new pricing program has been the approval it has received from producers and producers' cooperatives, from milk dealers, and from the newspapers in southern New England markets. Perhaps equally encouraging is the fact that the prices which the formula has created have already stimulated milk production without seriously affecting sales. The producer reaction may be different, of course, when the formula begins to create price reductions, but there is reason to believe that most farm groups in the area understand and appreciate the fairness of the formula. There is reason to hope, therefore, that it may be the most orderly means of bringing about downward price adjustments when they are needed.

FORMULA PRICING CLASS I MILK UNDER MARKET ORDERS

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FORMULAS have been used for several years in pricing Class I milk under market orders. Despite their widespread use, modification of formula procedure in markets using them has been necessary from time to time. Their continued use indicates that formulas are of value in pricing milk, but their frequent change indicates that amendment procedures including public hearings also are necessary.

It appears to be impossible to devise a formula which will function satisfactorily without change over the years. There are several reasons for this. First, there are many factors that affect the price of Class I milk, more factors than can be included in any formula. Second, there is uncertainty as to the weights that should be assigned to the various factors, and as to the extent of lag that should be allowed for in each case. Third, the weights and the lags which are appropriate at one time may be inadequate at a later date. Fourth, the acceptability of Class I prices to producers, distributors, and consumers is influenced by non-economic factors which change from time to time.

Recognition of these facts is important so that although public acceptability will result from the presentation of the basis of a formula when one is used, yet the imperfect nature of the formula will be generally known and undue resistance will not be offered to changes in the formula which will be needed.

Recent study of the use of formulas in pricing Class I milk has emphasized their construction for use within particular markets. Perhaps equally important is the degree to which various formulas are adaptable to use in competing markets in a manner which promotes logical and reasonable inter-market price relationships.

Year-to-year changes in price differentials between markets are much smaller in amount than are year-to-year changes in the Class I price in given markets. During 24 of the 27 years in the period 1922–1948, reported Class I prices in the Boston market fell within

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a range of 11 cents above and 22 cents below the Class I price in the New York market. In contrast to these relatively narrow changes in inter-market differentials, Class I prices in both the Boston and New York markets varied widely over the years. In the New York market, for example, the Class I price rose 80 cents per cwt. between 1924 and 1929, declined 162 cents between 1929 and 1932, rose 83 cents between 1932 and 1936, declined 39 cents between 1936 and 1938, and rose 330 cents between 1938 and the first nine months of 1948.

Changes in inter-market differentials have tended to become even less than usual during recent years. In the nine full years during which federal orders have been effective in both the Boston and New York markets, 1940–1948, the basic Boston price for Class I milk testing 3.7 percent has varied within the narrow range of 20 cents from the New York price for milk of similar test in the 200-mile zone. The differential remained at a fixed amount, with a Boston price 9 cents below New York, in the 32-month period from November 1943 through June 1946. It also remained at a fixed amount, with the Boston price 11 cents above New York, in the 17-month period from November 1946 through March 1948. The Boston price has averaged 11 cents above New York in the immediately succeeding months from April 1948 to date.

During these recent years when inter-market differentials have tended to change less than usual, their exact amounts have become more important. Fluid milk consumption has increased relative to production. Serious milk shortages in the late fall and early winter months have become common, especially in the Northeast. Acute competition for supplies has developed among markets with adjacent milksheds, with price premiums and other devices used as inducements to keep producers from shifting markets, on the one hand, and to encourage producers to shift markets, on the other.

One of the most important questions in the use of Class I milk price formulas, therefore, is this: Can a formula be devised which will bring about the wide swings needed to keep Class I prices in line with economic conditions which will also adjust properly the relatively minor changes needed from time to time in price differentials between adjacent markets?

Prior to April 1948, each of the 30 federal orders in effect in the United States contained Class I price formulas based on the manufacturing value of milk. Although the exact measure differed from

market to market, the "movers" in all of these formulas were national in scope. If the price of butter in the United States increased sufficiently, as judged by quotations in large cities, it affected Class I prices in each of the 30 markets. The exact effect of a change in the manufacturing value of milk was somewhat different in markets which were far apart, e.g., New York and Chicago, but the formulas were so devised that between adjacent markets, e.g., between New York and Boston, or between Chicago and St. Louis, a given change in manufacturing value would cause similar changes in Class I prices, and usually identical changes.

These formulas, then, did not provide for automatic change in inter-market differentials. Fixed differentials were established by setting up specified dollars and cents amounts in formula schedules for each of the various markets.

Beginning in April 1948, three of the 30 federal order markets, Boston, Lowell-Lawrence, and Fall River, have used a Class I price formula based on a national index of wholesale prices, a local index of department store sales, and a local index of feed-labor costs as prime movers, supplemented by an escape provision based on local changes in supply and consumption of milk during the past year. Considering the prime movers only, two of the three are local factors. If similar formulas were adopted in all other markets, inter-market differentials would be adjusted from month to month on the basis of differences in movement in these two factors. The escape provision might cause counter movements in the differentials after several months had elapsed, but the initial and continuing adjustors would be the two prime movers which are local factors.

It is extremely doubtful if changes in inter-market price differentials resulting from the adoption of this formula in some or all of the other 27 federal order markets would be logical or reasonable, judged either from the empirical record or from the standpoint of economic theory.

The record indicates that department store sales in various markets have followed widely different courses from month to month and from year to year. Such differences have not been associated with varying rates of fluid milk consumption. In the six leading cities of the New York Federal Reserve District, seasonally adjusted indices of department store sales in June 1948, on a 1935–1939 base, were 264 in New York City, 226 in Newark, 314 in Buffalo, 299 in Rochester, 349 in Syracuse, and 226 in Bridgeport.

If Class I prices in these markets had been established under a formula giving indices of department store sales a weight of one-third, inter-market differentials would have formed considerably different patterns from those that have been experienced to date.

The record indicates that although feed-labor indices in various milksheds have followed a more nearly similar course over the years than have department store sales, the amplitude of the upward and downward swings becomes greater as one moves from the East Coast toward the Middle West. Such inter-market differences in feed-labor indices have not been associated with inter-market differences in supplies of milk, either in the short run or in the long run. Between April and July 1948, for example, the reported farm wage rate in Vermont increased by $7.00 per month and the reported farm wage rate in New York increased by $1.00 per month. This change has not yet caused corresponding changes in milk supplies in the Boston milkshed compared with the New York milkshed, and is not likely to cause corresponding changes in the near future.

Historical data thus suggest that automatic adjustment of inter-market price differentials would result in pricing chaos if the model now used in federal order markets in New England should be adopted in other markets. That such would result is also in line with what would be expected on the basis of economic theory.

Determining changes in inter-market differentials by these factors assumes that fluid milk consumption is closely related to department store sales, and that fluid milk supply is closely related to feed-labor costs. Since there are so many factors affecting fluid milk consumption and supply, these assumptions would not be expected to be true. The consumption of milk from a given supply, for example, is determined by the number of people obtaining supplies from this source and the per capita rate of use. The second of these determinants, per capita rate of use, is related to such factors as retail milk prices (affected by Class I price and distributor's spread), consumer incomes, age composition of the population, prices of other foods, and the degree of nutritional recognition of the food value of milk. Even if complete and accurate data were available on consumer incomes, changes in fluid milk consumption which occur over time could not be predicted with great accuracy because of the influence of other important factors.

The supply of milk in a given milkshed is determined primarily

by production in the region and inter-market shifts of producers and plants. Milk production in a region, the first of the two determinants, depends upon the number of cows and production per cow. Whether a farmer keeps cows depends on alternative opportunities, particularly in industry in those regions where near-by industrial employment is possible. The decision also depends on costs in dairy farming relative to the price of milk. Production rates per cow depend upon such factors as prices of feed; farm wage rates; weather as it affects pastures, crop yields, and hay quality; and the changing milk-producing capacity of the cow population. Since so many important factors are involved, it is not surprising that feed-labor costs are not closely associated with changes in supplies in a given milkshed.

An alternative method of automatically adjusting inter-market differentials among federal order markets is to base the adjustment on changes in actual supplies, and in actual fluid milk consumption from these supplies, in each of several competing markets. In considering this method, it should be kept in mind that the question of what prime movers are best suited for use in a formula is not discussed in this paper except to point out that they should be regional or national, not milkshed-wide, in character.

Suppose that on the basis of evidence presented at a joint hearing, it were decided that the basic Class I prices in Market A and Market B should be the same. Suppose that in Market A 40 percent of the milk supply during the most recent 12 months had been used in surplus classes, and in Market B, 38 percent. A schedule could be set up providing that as the 12-month moving average of the percentage utilization of the milk supply in surplus classes changed in one market relative to another, the inter-market differential should be changed. Some small amount, such as two cents per cwt., could be provided as the change in inter-market differential associated with a one point deviation in the two series of percentages. If the percentage of the supply used in surplus classes should increase from 40 to 42 in Market A, and not change in Market B, the Class I price in Market A would be reduced four cents per cwt. relative to Market B. Detailed study might indicate, of course, that the adjustment rate should be three cents, four cents, or some other figure instead of two cents.

The economic basis for this adjustment is the fact that as one market becomes short of supplies relative to another adjacent

market, milk should move from one market to the other. Even with the differences in blend prices which result from changing utilization, shifts of plants and producers occur only with significant lags because of institutional factors, and are resisted by the payment of special price premiums. It appears economically sound to provide an extra incentive by changing the relative Class I prices when one market becomes short of supplies relative to the other so as to overcome part of the lag in needed adjustment.

In conclusion, the question of inter-market price differentials divides itself into two parts: (1) The determination of the amount of differential at a given point in time, on the basis of evidence presented at public hearings, and (2) possible automatic adjustment in the differential within the framework of Class I pricing formulas. Presented in this paper is a discussion of the second question, together with a suggested method of adjusting inter-market differentials which appears to the author of this paper to have merit. Such method may or may not be preferable to inter-market differentials which are set at fixed amounts following joint hearings, and which do not change until evidence presented at another joint hearing warrants a different fixed amount.

PRICING CLASS I MILK UNDER FEDERAL ORDERS*

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THE search for "better" methods for pricing milk has been going on for a long time. The current crop of "experts" are unlikely to find *the* method except possibly in terms of the present situation. Five and ten years from now the environment in which milk prices function will be different and at least the details of pricing techniques will need to be changed.

Most economists and probably most producers and distributors have concluded that market place prices like those we have for grains and livestock cannot be made to work for fluid milk because of the nature of the product and the health regulations surrounding its production and distribution. At one time bargaining between producer leaders and the distributors appeared to be the perfect substitute for market place prices. Bargaining was done by those most intimately acquainted with the local effects of price making forces. All too often, however, the bargaining parties used only that part of their knowledge which would help them as farmers to get higher prices or as buyers to justify lower prices. Combined with honest differences of interpretation, this attitude of self-protection led to repeated failures of bargaining. The result frequently was arbitration by an impartial third party.

Public hearings with government taking over the arbitrator's position were only a short step from bargaining conferences. Hearings preserved the theoretical advantages of bargaining, namely, the introduction of evidence by those closest to the local situation and the opportunity to give consideration to all of the price making forces. But the legal formality of hearings plus frequent window dressing by witnesses for the benefit of their customers has detracted seriously from the so called advantages provided by public hearings. Even more important, the protracted delays incidental to using government as the arbitrator has made public hearings inefficient as the sole means of establishing prices.

More recently, Class I formulas have been devised and used. Until the adoption of the Boston formula this year, all Class I

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formulas in federal order markets had been based on the price of some one or combination of manufactured dairy products. The use of such prices, at least in mid-western markets, has been based largely on the direct competition between the fluid market and manufactured products for the milk supply. The result of this competition was a direct relationship between the price of the manufactured product and the price of milk in the fluid market. The Class I price was arrived at by adding a charge for transportation and a premium for meeting sanitary requirements to the actual or approximate price paid by manufacturing plants. The determination of a proper premium was the major problem in arriving at the Class I price.

In eastern markets the use of formulas based on manufactured dairy products was accompanied by greater difficulties, very largely because supplies of milk for manufacturing were less important and more scattered than in the midwest. The problem of determining a proper transportation allowance was difficult and the concept itself lacked complete validity. The logic of using manufacturing values because of direct competition for supplies had to be bolstered by the theory that changes in prices of manufactured products measured changes in the underlying supply and demand conditions affecting the whole of the milk industry. In the Northeast, with but little milk at present being produced in excess of that needed to meet fluid milk requirements—except for seasonal surpluses—Class I formulas based on prices of manufactured dairy products appear to have lost their usefulness.

Class I formulas are needed in federal order markets primarily in order to bring about promptness of price changes. Manufactured dairy products formulas have filled this need in many markets and in addition have performed another useful function of determining the level of prices even over considerable periods of time. Incidentally, they also took a lot of responsibility off the shoulders of producer leaders, handlers and government.

In developing a Class I formula the Boston Committee naturally tried to find some combination of factors that would function in the east as manufacturing values had in the mid-west, something that would dictate the level of the price as well as move it promptly. The relatively new type of formula the Committee developed uses several series of data in combination to reflect variations in the demand for and supply of milk. To date there has been no demonstra-

tion of a precise relationship over long periods of time between an adequate Class I price and indexes of any of the many series of data that might be used to reflect changes in demand and supply. Nor is it logical to expect a precise relationship to endure through inflation, deflation and technological change. When first proposed, the four series in the Boston formula were 53, 74, 98 and 104 percent above their respective 1925–1929 averages. With very little scientific basis for weighting, it seems illogical to assume that a combination of these four factors will give the correct percentage change in the price of Class I milk since 1925–1929. I doubt whether this new type of formula, regardless of the factors it contains, can be used as a determiner of the proper level of prices over more than a brief period of time.

The basic idea which led to the selection of factors in the Boston formula undoubtedly will be copied by the Philadelphia Committee in whatever formula it recommends. The economic series used to reflect general economic conditions and changes in demand and supply peculiar to fluid milk, however, are unlikely to be the same ones, in all instances at least, as those used in Boston.

The Philadelphia Committee hopes to be able to work out a plan which will use regularly scheduled hearings to determine the level of prices plus a formula to change prices between hearings and to indicate the level of the price to be examined at the hearings. In this manner the Committee hopes to combine the advantages of both hearings and a formula. By using the indicated formula price as a proposal at each hearing it is hoped to cause the presentation of more adequate and related evidence and thus strengthen the functioning of the hearing process.

I have mentioned the lack of precise relationships between the Class I price and the various reflectors of supply and demand as one reason why hearings are needed to determine the level of the price in relation to the formula factors and then to examine periodically the adequacy of the formula price. There are other reasons. No formula of the Boston type will ever contain reflectors of all of the price making forces, and even if one does, the various reflectors will not be perfectly weighted. Furthermore, the relative importance of price making forces will change from time to time.

The Philadelphia Committee expects to recommend that price changes between hearings occur only as a result of major changes in the formula values. For example, if the price is set by the hearing

at $6.00 when the formula index is 100 the price will not change until the formula moves by an amount equal to a change of twenty cents in the Class I price. Following the first such change after a price hearing, the price will not move again either in the same or reverse direction unless a similar major movement occurs in the formula value. The need for a price change, at least when the bracket system is used, is not indicated by the fact that a formula index reaches either 105, 110, or any other particular point but rather by the fact that a particular amount of movement has occurred. It is not where the formula index is but how much it has changed that is important.

A partial list of reasons why pricing methods should be expected to vary from one market to another would include differences in health regulations, in types of farming, in seasonality of production, in the leadership of producers' cooperative organizations and in the availability of unapproved milk supplies, Because of these differences, the Philadelphia Committee will make no claim of recommending the one and only method for pricing Class I milk. From my viewpoint the method used to price milk in Boston, and the methods which will be recommended by Committees in other markets are in the nature of experiments. One reason why I recalled a brief history of price determining methods was to indicate that such experiments have been made before and will need to be made in the future if pricing methods are to keep up with changing conditions.

PRINCIPLES FOR PRICING MARKET MILK*

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THE principal objective of a university is to assemble, discover, and disseminate truths which will be most useful in improving the standards of living of the people whom it serves. Hence, in setting down principles for pricing of market milk, the first question which a university researcher may logically raise is: *Is the proposed pricing policy in line with public interest?* Does it tend to encourage the maintenance and expansion of sales of market milk in line with nutritional needs? Does it tend to promote harmony between producers and dealers and to put a stop to milk strikes which in the past have been costly to all groups?

A second question: *Is the proposed pricing policy fair to the various interests involved?* Is it fair to farmers? Is it fair to dealers? Is it fair to labor?

A third question: *Is the proposed pricing policy workable?* A large number of proposals for policy changes are impractical because for one reason or another they would not be accepted by the groups affected. Eventual acceptance by both producers and dealers is essential to the practical operation of any milk pricing policy.

Keeping in mind the above facts, the following principles are suggested as a basis for determining the price of market milk used in whole form:

1. *Both milk and cream for any market should be produced in areas where costs of getting milk produced plus transport costs are the lowest.* If Minnesota or Illinois farmers can produce high-quality milk and transport it to Florida or Texas more cheaply than it can be produced in these states, it should be produced in Minnesota. From a public viewpoint, consumers are interested in getting high-quality products at reasonable prices. An underlying basis for the high standards of living in the United States has been the application of the "law of comparative advantage," wherein goods are produced in low-cost areas. Michigan and New York produce large quantities of apples, but no oranges; most of our oranges are pro-

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duced in California and Florida, where the natural advantage of climate results in low-cost orange production.

Cream can be shipped long distances at relatively low cost. Costs for hauling cream are about one-tenth of those for hauling market milk. Much cream is still being separated from market milk in several eastern markets. In New York City, for example, a major part of the cream used is obtained from milk produced in the New York milkshed. As a long-time program, it is good economics for eastern markets to use as market milk as large a proportion of its total production as possible and to make up shortages with shipments of cream from the surplus producing areas of the midwest. In some markets this will necessitate shifting of some producers from one milkshed to another or working out some method for intermarket shipments of milk.

2. *The price for market milk (Class I) should be established in a federal order so that it automatically goes up or down in line with some dynamic factor, such as prices of manufactured dairy products, consumers' income, other farm prices, or some combination of these price series.* During World War I there was an epidemic of milk strikes throughout the country accompanied by physical violence, dumping of milk, and much bitterness between milk dealers and dairy farmers over the question of pricing of milk. In sharp contrast to this situation, during the past eight years most markets have had no milk strikes and, for the most part, producers and dealers have worked together to use the milk produced in the best way possible to meet a shortage of this important product. Why this difference?

This difference can be attributed to: First to the nation-wide acceptance of collective bargaining between dairy farmers and milk dealers; second, to the operation of federal milk orders in some 30 markets in which milk prices have been geared to change automatically with changes in prices of manufactured dairy products; and third, to a 14-year period of rising prices.

3. *The price for market milk (Class I) should be established at premiums above prices of manufactured dairy products sufficiently high to get a blend price which will encourage enough but not too much milk to meet market needs. Bottom prices of manufactured dairy products should be kept as high as practical to prevent Class I prices being too high.* and to prevent dealers who handle a large volume of surplus milk from having an unfair advantage over dealers

whose purchases are largely for Class I sales. A monthly average of around 20 percent above Class I requirements is necessary to meet day-to-day changes in production and sales.

4. Since it is uneconomical to produce large quantities of Grade A or other high-priced milk to be manufactured into lower priced surplus products, *premiums paid for Class I milk above prices for manufactured dairy products*:

(a) *Should be larger in months of low production and smaller in months of high production to encourage an annual production more nearly in line with a market's need for milk and*

(b) *Should be raised on an annual basis if there is too little milk to meet whole milk requirements, and lowered if the blend price results in too much milk in the shortage months to meet whole milk requirements.*

The Boston Milkshed Price Committee is to be commended for its action in providing for an automatic increase in Class I premiums when production in relation to Class I sales is too low and a decrease in these premiums when production in relation to Class I sales is too high.

To stimulate thinking, on July 8, I presented an application of the Boston principle of flexible premiums at a federal order hearing in St. Louis. Present St. Louis premiums above condensery prices are $1.35 per 100 pounds from July to December, $1.10 from January to March, and 90 cents per 100 pounds from April to June. A study of St. Louis production and sales in recent years showed that a surplus of 28 percent above Class I sales was necessary to provide a necessary monthly surplus and seasonal surplus.

The adjustments suggested were: (1) If actual surplus for the past year is less than 28 percent above Class I sales, add 2 or 3 cents per 100 pounds for each percent that actual surplus is less than 28 percent; if actual surplus were more than 28 percent above Class I sales subtract 2 or 3 cents per 100 pounds for each percent that actual surplus exceeded 28 percent. Additions or reductions to premiums would be effective for each of the next 12 months.

This method would provide an automatic change in premiums above condensery prices every year, and each year call to producers attention the importance of producing enough but not too much milk to meet Class I needs.

The computations for arriving at the amounts that would have been added or subtracted from premiums paid for Class I milk

above the 23 condensery average price in the St. Louis market from 1941 to 1947, are shown as follows:

Year	Proportion that Class I sales were of total production	Actual surplus above Class I sales	Necessary plus seasonal surplus base period 1941–47	Amount actual surplus was above or below 28 percent	Amount that Class I price would have changed if adjustments had been made	
					At 2 cents for each percentage	At 3 cents for each percentage
	(percent)	(percent)	(percent)	(percent)	(per 100 pounds)	
1941	62	38	28	−10	$−.20	$−.30
1942	77	23	28	+ 5	+.10	+.15
1943	88	12	28	+16	+.32	+.48
1944	83	17	28	+11	+.22	+.33
1945	84	16	28	+12	+.24	+.36
1946	89	11	28	+17	+.34	+.51
1947	88	12	28	+16	+.32	+.48

ROUNDTABLE ON EFFECTS OF TECHNOLOGICAL CHANGES ON COST REDUCTION IN AGRICULTURE

Chairman: Sherman E. Johnson, Bureau of Agricultural Economics

EFFECTS OF TECHNOLOGICAL CHANGES ON COST REDUCTION IN AGRICULTURE: RECENT AND PROSPECTIVE CHANGES*

GLEN T. BARTON
Bureau of Agricultural Economics

RECENT and prospective changes in technology and cost reduction in American agriculture can best be appraised against the background of changes over the last quarter of a century. Violent fluctuations in the price level over this period have obscured the significant effects of such changes. Recent studies of the Bureau of Agricultural Economics, which involved construction of series of constant-dollar costs of production or production inputs, and other related data, provide the basis for a broad examination of technological forces and cost reductions for United States agriculture as a whole.[1]

Since World War I all inputs per unit of farm output in the United States have been reduced by 25 percent. During this period total production inputs—land, labor, machinery, and other materials valued in constant dollars—increased about 15 percent, and the volume of farm output rose by 50 percent. Reductions in inputs per unit of output were due mainly to the rise in volume of output, not to a decrease in total production inputs. Both the rise in output and the increase in production efficiency resulted mainly from technological forces that raised production per farm worker and per man-hour, per crop acre, per breeding unit of livestock, and per unit of farm power and machinery.

Although the upward trends in efficiency of farm production are definite and long-time, some cyclical movements appear to have been conditioned by war and depression and the accompanying variations in economic conditions. Total production inputs rose slightly during and following World War I when farmers were

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[1] See U.S.D.A. Miscellaneous Publication 630, *Progress of Farm Mechanization*, by Martin R. Cooper, Glen T. Barton, and Albert P. Brodell.

beginning the transition from animal power to mechanical power and equipment. During the depression and drought period of the 1930's, total inputs declined. Over the interwar period as a whole, however, total production inputs changed very little, while volume of output generally rose.

The World War II period witnessed an unprecedented rise in farm output. Total production inputs also increased as farmers added greatly to their inventory of power and machinery, doubled their use of fertilizer, and generally increased the use of production goods necessary to our modern way of farming. The long-time downward trend in inputs per unit of output continued during the early part of the war. Since 1942, however, total production inputs have continued to climb chiefly because of increased mechanization, while volume of farm output has not increased nearly so much. As a result, there has been a halt in the decline in inputs per unit of farm output.

There is every reason to believe that technological forces will effect further reductions in inputs per unit of output over the longer period ahead. But this may not be the case in the next few years of transition. Farmers are better stocked with power and equipment in relation to cropland area than at any other time on record. Compared with 1940 farmers now have more than twice as many tractors, combines, mechanical corn pickers, and milking machines, and nearly 50 percent more total power and machinery. And they are likely to continue to add to machinery inventories as long as farm incomes remain high. Inputs of power and equipment will increase, probably by a greater amount than inputs of farm labor decrease, as mechanization proceeds to smaller farms, and as larger farms are further mechanized.

It is physically possible to expand farm output considerably in the space of a few years by greatly increasing the use of fertilizer, and by more intensive and widespread use of known improved production practices. But even with the further mechanization that is in prospect our farmers are not likely to increase total output greatly in the immediate future. Favorable weather has played an important part in the high level of farm output in recent years. Further advances in the technological forces which raise crop and livestock yields may have to compensate for a return to average growing conditions during the next few years. With moderate increases in output, and a continued high level of production inputs,

inputs per unit of output may show little change, and may actually increase in the immediate future.

Over the next generation the long-time trend in efficiency of farm production or cost reduction should persist. Farmers will be able to increase their production at least as fast as our total population increases. Undoubtedly there will be a further replacement of horses and mules by mechanical power. This will add another 15 to 20 million acres of cropland to the more than 55 million acres already released from production of feed for workstock to output of products for the market. But replacement of animal power by mechanical power will have a gradually decreasing effect on farm output as the number of horses and mules approaches a minimum. On the other hand, greater timeliness in farming operations owing to increased mechanization will add to our annual output.

Continued downward trends in total labor requirements and in farm employment seem certain. Net change in the total area of our cropland is likely to be slight. Production per acre will probably show an upward trend because of even greater use of fertilizer, lime, better seeds, and soil-building practices, and of new improved techniques not now on the horizon. In short, the next generation should witness a continuation of the technological forces that have resulted in reductions in inputs per unit of output over the last generation.

The future rate of decrease in inputs per unit of output may not be as great as in the last quarter of a century. More of the increased mechanization in the future may have to be charged to less drudgery and more comfortable working conditions, rather than to increased production efficiency. Labor-saving machines may be costly and less efficient on smaller and less productive farms. But in many instances these machines may provide the farm operator with free time to engage in profitable nonfarm work.

If past trends in the composition of production inputs continue, our farm people will pay cash for an increasing proportion of their production inputs. With a high percentage of cash production costs, farmers will be increasingly vulnerable to future fluctuations in prices of production goods and in prices of farm products.

EFFECTS OF TECHNOLOGICAL CHANGES ON NORTHEASTERN AGRICULTURE*

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TECHNOLOGICAL innovation in Northeastern agriculture has taken place in a system of farming long established and, in some respects, considerably matured under the patterns of regional competition and the farming methods of an earlier day. As far back as the turn of the century, agriculture in the Northeast, had already attained its maximum expansion in number of farms, farm acreage, and even in number of dairy cows.

And by no means is the technological change all of recent vintage. Strong forces were at work at least as early as 1870. A rising degree of commercial production was steadily displacing the traditional, highly self-sufficient Down-East farm economy. Horse-powered equipment was rapidly introduced, and improvements, both in crops and livestock and in crop and livestock management, were much greater in this early period than is now generally acknowledged. Perhaps the most outstanding example of the improvement was a 70 percent increase in milk production per cow between 1870 and 1900—nearly twice the increase in milk yield that has been accomplished in the Northeast by all the cow and cow management improvements since then. The total of such developments in the 30 years prior to 1900 resulted in a 50 percent increase in the crop and livestock output of the eleven Northeastern states.

But technological changes in transportation and in food processing and handling were then adding to the competitive pressures on Northeastern farmers. In the 30 years following 1900, Northeastern farm production increased only 12 percent. One acre in four of the land farmed at the beginning of the century had been abandoned by 1930. One in four of the farm labor force had moved to other areas or other jobs as alternative employment came to look more attractive than the opportunity on many of the less productive farms. Such evidence indicates that agriculture in the Northeast had retracted even before the Great Depression.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

More recently the increasing tempo of technological change has been a revitalizing shot in the arm. Crop and livestock output increased 28 percent from the early Thirties to the mid-Forties. Farm acreage remained essentially unchanged. But increased mechanization both in the fields and at the farmsteads, improved breeding and feeding practices, better disease and pest control, improved crop strains, a near doubling of fertilizer usage, and similar advances, have boosted output per acre, per animal, and per labor hour. Marked shifts have taken place in the combination of production factors, and the technical problems of management have been sharply increased.

How much unit costs of production have been reduced by these changes in Northeastern agriculture we do not have evidence to show. But physical inputs per unit of output, at least on some important Northeastern enterprises, have decreased sharply.

For example, during 1914–18, hens on New York cost-account farms laid an annual average of 87 eggs. In 1929–33, production per bird was up to 135 eggs, and in 1939–44, up to 163. Production per labor hour increased from 54 eggs in the World War I period to 96 eggs in the early Forties. Feed consumption in the laying flocks was 9.2 pounds per dozen eggs in 1914–18 and 7.2 pounds in 1939–44.

Assuming comparable changes throughout the Northeast; if the 533 million dozen of eggs produced in the eleven states in 1944 had been produced at World War I rates of feed and labor efficiency, feed consumption by the laying flocks would have been greater by 500,000 tons. Labor requirements in egg production alone would have been greater by 48 million man-hours. While labor required to produce the additional feed *and* to care for the hens would have been equivalent to year-round work for 20,000 farm workers.

Another example of increased output at low cost is the use of DDT for potato leaf-hopper control. This insecticide is apparenty adding 10 to 15 percent to acre yields at a rather insignificant cost increase over the spray schedule formerly applied.

Then, of course, there is the shift from horses to tractor power. Northeastern farmers have decreased horse numbers relative to their crop acreage even more than the national average. From World War I to World War II, New York cost-account farmers reduced the number of horses on their farms by 55 percent, but they

decreased the number of horse-hours worked by 75 percent. Many farmers are keeping a last team of horses on the farm out of sentiment, but have retired them to pasture (on horse social security) where they will live out the rest of their days. A farmer cannot pay going wages, or earn the equivalent himself, and slow up accomplishment as is done when horses are used. At cost-account farm rates during the early Forties, it cost $5.50 an acre for labor, power, and equipment to plow an acre with horses, but only $2 an acre with a tractor. Northeastern farmers now have more tractors per hundred acres of cropland than does any other region of the country—not because they have need for more tractor power per farm but because many farms with tractors have only a few acres of crops, and still the tractor is cheaper than horses.

Item after additional item of crop and livestock improvement or of innovation in production method and equipment might be added until the total became truly indigestible but each one would merely illustrate the same story in greater or lesser degree.

Agriculture in all regions of the country is in a tightspun upward spiral of technological progress. Every commercial farmer is under pressure to keep up with the rising tempo of innovation or he will lose out on a unit-cost-of-production basis to other farmers who push on ahead. That is as true in the Northeast as elsewhere.

Perhaps it is even more true. Because of its very large urban population the Northeast produces only a third of the food consumed in the region. Other areas are already geared to shipping large quantities of produce to Northeastern markets. If the farmer in the Northeast does not keep up with the advancing technology that is applicable to his business, he may soon face difficulty in the market and have an increasing problem in squeezing a profit from between *his* unit costs and the market price.

The probability is we have only begun to see the technological changes that will come in the years ahead. They will continue to change farm organization, factor combinations, and management problems. They will continue to boost farm output, and probably to reduce total inputs relative to outputs. Whatever net contributions are made to success in farm operation and to national welfare, there will be many problems for farm economists growing out of the changes.

EFFECTS OF TECHNOLOGICAL CHANGES ON COST REDUCTION IN AGRICULTURE: EFFECTS IN THE MIDWEST*

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IN GENERAL the characteristics of agriculture in the north central states have favored rapid and widespread technological changes. Such changes have either increased the product per acre of land or animal unit, or decreased inputs of production factors, particularly labor. More than thirty years of cost accounting in Illinois, mainly by R. H. Wilcox, provides a good deal of information regarding the effects of technological changes throughout the Midwest.

Crop Yields

During the 1920's corn yields on Illinois cost accounting farms were rather stable at 45 to 50 bushels per acre. Yields were low in 1933 as well as in 1934 and 1936. Beginning with 1937, yields increased phenomenally to a three-year average peak of 70 bushels in 1941–43. It is estimated that the complete shift to hybrid seed accounts for a 20 percent increase in yield: this is about half of the increase on the accounting farms from the level of the "twenties." The other half of the increase was the result of favorable growing seasons, increased mechanization, and better land treatment, including legumes and fertilizers. In several of the years of highest yields the planting season was quite unfavorable, but mechanization made it possible to get the crops in the ground on short notice when the rains stopped. Even in a normal year the better seed beds and more timely planting made possible by tractor power have a certain but undetermined effect on yields.

Soybeans were first grown for beans on Illinois cost account farms in the early "twenties." Early yields averaged 15 to 20 bushels per acre. Yields increased steadily to a three-year peak of 30 bushels in 1937–39. New varieties had an important effect. Also it was a case of farmers learning how to grow a new crop. The fact that these particular farms were rather highly mechanized enabled them to quickly acquire the "know-how."

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

Yields of oats and wheat have also increased on these farms, but in neither case has the increase been as striking as for corn between 1937 and 1942 or for soybeans between 1928 and 1938. From the rapid rate at which improved varieties of oats are being extended at the present time it looks as if the effect on average yields may be comparable to that of hybrid corn.

The purchase of fertilizers has increased a great deal, particularly in the past five years. The effect of these fertilizers on yields of the accounting farms is obscured by the fact that yields of both corn and soybeans have declined in recent years. It should be noted that the cost account farms are in an area where corn and soybeans production have been particularly intensive: the two crops have been grown on about three-fourths of all tillable land. Lower yields reflect this intensive use.

Labor and Crop Production

The most striking effect of mechanization has been the reduction of labor in crop production. On cost account farms the hours required to grow and harvest an acre of corn has steadily declined from over 18 before the days of the tractor to between 6.5 and 7 hours now that the horse has been almost entirely displaced in corn production. In soybean production labor requirements declined from 13 hours per acre in the early 1920's to just over 4 hours in 1936. This was the period of rapid expansion of the combine: incidentally, we would not have had the rapid expansion of soybeans in the corn belt except for the combine. Since 1937, when the last soybeans were threshed on the cost account farms, average labor inputs per acre have not changed.

Changes in Livestock

Although the effects of technological changes in livestock production are not as spectacular as those in crop production, they have been significant. On Central Illinois cost account farms the corn required to produce 100 pounds of hogs declined from 502 pounds in 1920–24 to 421 pounds in 1942–46. Better breeding, better feeding, and better control of parasites and disease all contributed to the decline in corn requirements. Better feeding is indicated by an increase in the tankage equivalent per 100 pounds of pork produced from 15 pounds in 1920–24 to 26 pounds in 1942–46. Better sanitation and better feeding are indicated by an in-

crease in pasture charged to the hogs from .5 to 4.2 animal unit days per hundred-weight produced. On the cost account farms, which are not in a major hog area, there has been no significant change in the labor requirement on hogs.

Dairy cost studies have been made in Northern Illinois at three different periods, 1911–12, 1927, and 1936–37. Milk production per cow averaged 6,800 pounds in the first study, 8,000 pounds in the second, and 8,300 in the last. The quantities of concentrates and hay fed per cow remained about the same; quantities of silage and other roughage declined materially. The days of pasture were materially increased and the quality greatly improved. Improved breeding, disease control, and better feeding have materially increased efficiency in milk production. In better feeding the increased use of improved pastures has been a major factor. In the studies referred to labor per cow declined from 161 hours in 1911–12 to 118 hours in 1936–37.

Increase in Cash Costs

Particularly in crop production the effect of technological changes has been to increase the proportion of cash costs. According to Wilcox about 75 percent of the cost of producing corn today represents a cash outlay, including the purchase price as well as operating costs for machinery. This compares with only 35 percent in 1913 to 1915. In soybean production 70 percent of the cost is cash outlay compared to 45 percent in the early 1920's.

EFFECTS OF SELECTED CHANGES IN TECHNOLOGY ON WESTERN AGRICULTURE*

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A STEADY progression of technological advances affecting western agriculture has resulted in sharp changes in factor ratios and labor efficiency. The major developments affecting western production, mainly tillage and harvesting equipment and tractor power, have, of course, been common to other sections of the country. Other common developments having notable effect in the West are the mechanical potato picker, power orchard sprayers, and in the chemical line, the recent applications of D.D.T. and weed sprays. Biological developments in agricultural production have likewise played a major part on a broad front in maintaining agricultural output and reducing unit costs.

Limitations of time and facts preclude a broad survey of the effects of technological changes on western agriculture. Consequently, it seems appropriate to concentrate primarily on important changes in the farm economy of the Palouse wheat-pea area of Washington and Idaho which have been associated with technical changes between 1919 and 1944. Comparisons for this period are derived from data obtained from comprehensive farm records taken from what are believed to be a representative group of Palouse farms during 1919 and 1920 and during 1942 and 1944.[1] The years between the wars witnessed the almost complete displacement of horses and mules by tractors; first, the wheeled variety and later, track laying tractors. This change was accompanied by the abandonment of threshing machines in favor of successively improved combines. In addition, there have been many other developments in tillage machinery made possible by the introduction of tractor power. The hilly Palouse with its deep, wind blown loam soil was well adapted to these large scale changes in technology.

Sharp changes in factor relationships accompanied or closely followed the technical advances. Average farm size, as indicated

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

[1] Keith Carter, recent graduate student at the State College of Washington, prepared work sheets from which these data were taken.

by crop acres, increased from 291 acres in 1919–1920 to 498 acres as of the 1942–1944 average. This average increase of almost 70 percent in crop acres per farm was accompanied by an average increase of only 0.2 of one man equivalent per farm. For the earlier period, 1.8 average man equivalents per farm were reported as against two man equivalents per farm in the latter period. Accordingly, the average crop acres per man increased from 160 crop acres to 250 between the two dates.

The shift from horses and mules was reflected by the Palouse farm data which shows an average value of horses and mules on farms in 1919 and 1920 of $1,230 and a negligible value in 1942–44. Power equipment, on the other hand, reported as negligible in the earlier period averaged $2,600 in 1942–44. Average machinery and equipment investment per acre increased from less than $5.00 per acre to more than $10.00 per acre between the two dates. Average machinery and equipment investment per man, of course, increased even more strikingly as the figure rose from $700 to $2,600 during the period. Average total capital per farm which increased from $50,000 to $71,000 reflected the increased quantity and value of machinery and power equipment, as well as the increase in number of acres operated per farm. Land values were higher in the earlier period standing at an average of $154 per acre for 1919–20 as against $124 per acre average for 1942–44. Real estate, which constituted 90 percent of the value of all capital per farm in the early period amounted to 87 percent in 1942–44.

Machinery and equipment, on the other hand, increased from less than three percent to more than seven per cent of total average capital.

Changes in net farm income considered as the return to capital and management were no less striking than were the physical relationships already considered. The increase in average net annual farm income from below $3,000 to almost $17,000 was not attributable alone to changes in technology. During the 1919–20 period almost one-third of total crop acreage was reported in summer fallow. This is in sharp contrast to the approximately five percent of the crop acreage report in summer fallow in the 1942–44 period. A very large part of this shift away from summer fallow represented crop acres put to growing dry field peas. It appears that the great war period demand for dry peas was largely responsible for the

substantial increase of this crop which sold at highly remunerative prices ranging up close to $5.00 per 100 pounds.

Expanded net farm income in the wheat-pea area, as between the dates under consideration, took place notwithstanding relatively less favorable price relationships during the latter period. During 1919 and 1920 the Washington State wheat price index, on a 1910–1914 base, was about 50 points above the index of prices paid by farmers. In marked contrast, the 1942 and 1944 price relationships show the Washington wheat price index lagging prices paid by farmers by about 25 points. This disparity between wheat prices and prices paid by farmers was, of course, adequately corrected subsequent to 1944 and the farm income experience has happily improved.

Continued development in chemical techniques for weed control may provide a further important cost reducing improvement for this area, which still leans heavily upon costly fallowing practices is the leading method of weed control.

Aside from important improvements in pest and disease control materials and methods, the fruit industries of the West have made relatively little gain in a technological way. Livestock production is, of course, even more noteworthy in this respect.

TECHNOLOGY AND THE COST STRUCTURE ON SOUTHERN FARMS*

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THE current turning point from shortages to numerous surpluses finds much of southern agriculture in the throes of continuing transition from mule to tractor power, from declining specialization to further diversification, and from small to medium-sized operating units. These circumstances present an involved setting for consideration of the "push" and "pull" of technological advancements and the farm-costs structure in the South.

Technology, Production Combinations, and Costs

Clarity is gained by differentiating between two main groups of technological advancements which affect production combinations and in turn the costs structure in farming. Group I consists of simple technological changes. They can be made within the framework of prevailing sizes and types of farms. These advancements increase output and lower unit costs without substantially altering the factor combinations. As long as market gluts are avoided, simple technological advancements increase returns to each of the factors of production. After a time lag, downward adjustments in price reflect a part and sometimes all of the lower costs. Individual enterprisers who adopt new varieties or increase the rate of application of nitrogen fertilizer at an early stage take advantage of the time lag before widespread adoption of the improvement and for a while they increase their own net income in both an absolute and a relative sense.

In general, the simple technological advancements of group I do not affect overhead costs directly, but they do change variable costs directly and substantially. Obviously, a 30-bushel per acre increase in yield of corn brought about by the addition of 60 pounds of nitrogen at approximately 12 cents a pound means lowered costs. The new organic insecticides for control of boll weevils, aphids and boll worms, such as benzene hexachloride and chlorinated camphene, lift the yield ceiling for cotton with very little

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

increase compared with the costs when calcium arsenate plus nicotine is used. Anhydrous ammonia applied directly into the soil as a source of nitrogen upon approximately 500,000 acres of cotton lowered variable costs on those farms. From the standpoint of crop responses, anhydrous ammonia gives results equivalent to ammonium nitrate pound for pound of nitrogen. A pound of nitrogen costs about 7 cents in ammonia and approximately 12 cents in nitrate form. Handling ammonia with pressures between 200 and 250 pounds per square inch means that costs of farm storage and field application are higher than for dry nitrates, but these costs will not absorb more than half the difference.

On southern farms, as elsewhere during wartime "shortages," production was extended much beyond lowest costs combinations. Therefore, the pull for simple technological advancements reflected the larger volume of production at more nearly the highest profit combinations. Shortages of fertilizer and labor also stimulated many farmers to seek new techniques. Unfortunately, the potential supplies of cotton and flue-cured and dark tobaccos may again result in a situation in which simple technological advancement must push its way into production combinations strictly from a costs standpoint. This may have to come in the face of reduced volumes per operating unit and in the aggregate for many products.

Farmers in cotton-growing areas are unlikely to gain directly, compared with other areas in the United States, in terms of relative levels of income from simple technological advancements. Actually, limitations growing out of the fact that such a large segment of costs for cotton and tobacco are costs for hand labor will probably cause producers of those crops to fall farther behind when only simple technological advancements are considered. The greatest contribution that simple technological advancements can make toward improving the cotton situation in the United States is by improving the competitive positions through lowered costs and prices for that fiber in relation to synthetics and foreign-grown lint. A large share of the direct benefit therefrom will accrue to consumers of cotton goods rather than to cotton farms so long as the basic production combinations remain about as they are now. Recognition of mutual interests by producers and consumers of cotton is imperative. Unfortunately, an approach through price alone will not work toward the long-term best interests of either.

Complex Technological Advancements

Group II, or complex technological advancements, alter factor combinations substantially and change considerably the share going to each factor of production. Their adoption requires the reshaping of a high proportion of existing sizes and types of farms. Generally, complex technological advancements increase the output of the individual farm and the income of the individual enterpriser, but they may or may not increase the output at a given price for a particular farm product. Their effect upon total output for a product depends upon natural limitations to effective use of new methods and upon shifts in relative profitableness between enterprises with new methods. Inevitably, they affect in far-reaching ways both overhead and variable costs.

Complex technological advancements change both the capacity and efficiency of the factors of production in their relationships to one another.[1] The spindle type of cotton picker changes the capacity of labor for capital from 1 laborer in combination with a 3-dollar pick sack and approximately 5 dollars additional capital investment for scales, trailers, and other service items per hand picker to 1 driver in combination with a $7,800 machine. One man picking by hand would commonly harvest 150 pounds of seed cotton or approximately a third of the yield from one acre in one day. The picker and its operator would gather 7,500 pounds of seed cotton in one day in cotton yielding 450 pounds of lint per acre. Similarly, the capacity of labor for management would be altered.

But mechanical pickers alter the basic combination of production factors for only one operation—that of harvesting. Either hill-drop planting or cross-cultivation may be used to eliminate hand chopping in obtaining a desirable stand. The one remaining peak load for hand labor in production of cotton in the "rain-grown" areas is the control of weeds. Prospects are promising for effective use of chemicals, particularly petroleum derivatives, to control grasses in cotton. This may eliminate the remaining hand operations. Taken alone, any one of these innovations will affect somewhat the contributions and the returns to particular factors in cotton production. Fitted together into a fully mechanized production system, the large seasonal labor demands for cotton

[1] Capacity and efficiency used as dimensions of productivity, J. D. Black, A. G. Black, *Production Organization*, Henry Holt Co. (New York, 1939) 157.

eventually may be eliminated. With mules for power and family aid in hand hoeing for weed control and picking, one man can handle about 10 acres of cotton, and a little corn in addition. With full mechanization, assuming the development of mechanized weed-control techniques that are effective, one man may be able to handle 100 acres of cotton plus a substantial acreage of small grains, grain sorghum, or soybeans in the alluvial areas. With these complex technological advancements, the capacity for labor of alluvial land in the Mississippi Delta would be greatly reduced; for capital it would be greatly increased, and for management it would be altered in kind.

With current transition forces at work, the necessity of hand labor for weed control, and the high prices of mechanical equipment current costs on southern farms are extremely high. As in the case of simple technological advancements, the pull for mechanization has reflected profit combinations that are not coincident with minimum costs and shortages of labor. It would appear that supply accumulations during the next 2 or 3 years will mean that mechanization and other complex technological advancements will have to push their way into farming systems strictly upon a cost-lowering basis. Serious complications and high financial risks will arise in this process, as mechanical power and equipment require large initial investments and higher cash operating costs. Larger cash reserves will be necessary and chances for financial disaster for the individual farmer will be greater during periods of low prices.

Time limitations do not permit a review of the probable effects of technology upon factor efficiency. But, as progress is made toward mechanization on cotton farms and elsewhere in the South, the reflections in costs of economically efficient combinations of factors will provide the key to higher incomes considered both in the absolute sense and in relation to incomes on farms in other areas. Production coefficients and cost ratios for varying qualities and quantities of factors used in combinations are yet to be determined for many aspects of cotton mechanization and other complex technological changes. They represent the job ahead for agronomists, engineers, and economists. They must become the basic data for appraisals of complex technological advancements and their relationship to farming costs.

PANEL DISCUSSION ON WORKSHOPS*

WORKSHOPS A LEARNING PROCESS

JOSEPH ACKERMAN
Farm Foundation

THE Farm Foundation recently has become interested in helping to sponsor workshops in land tenure research, farm management research, and in extension problems. The first of these held in 1945 brought together a small group of people interested in land tenure—and subsequent workshops have been held in tenure research each year. These, as well as the farm management one held this past summer, will be referred to later and discussed in more detail by other members of the panel. It is from the experiences of these workshops that I want to tell you something of the philosophy, objectives, and possibilities of workshops as a means of improving techniques in agricultural research and admininistration.

A workshop, in the sense we use the term, is a meeting of a group of individuals over a long enough period that they can think and plan together. They exchange ideas, obtain new slants on old problems, and revitalize their techniques to do better work on what they are doing.

There is no uniform pattern for a workshop—nor is the technique a completely new department in educational theory. In fact, activities somewhat similar to those carried on in workshops have been held under different names for quite some time. The workshop technique is an effort to utilize all of the resources and methods available in order to provide that combination of experiences which will most effectively meet the needs of those who participate.

Workshops are designed to give those who attend an opportunity to work on important problems without the interruption of the telephone, classroom lectures, seminars, and the like. It provides an opportunity not only to develop projects and investigate problems of individual significance but also enables one to get ideas from others and exchange significant experiences by working on similar problems.

As most of you know, my work in the Farm Foundation has given me an opportunity to become acquainted with the agricultural

* A panel discussion at the Annual Meeting of the American Farm Economic Association at Green Lake, Wisc., September 14, 1948.

economics research, both past and current, in most of the land-grant colleges. I have counselled particularly with those working in the field of land economics, and farm management. Early in my explorations of the research work I became impressed with the need for more emphasis on methodology. Too few colleges offered specific courses in research theory and none coordinated agricultural theory with research methods. Students were expected to do a job of problem investigation without an adequate background. Moreover, it appeared that land economics research was not receiving adequate emphasis in many colleges.

It seemed desirable, therefore, to stimulate some general interest in this phase of agriculture. The matter of what to do was discussed with several people and frequently with Director Noble Clark, administrative adviser to the North Central Land Tenure. Committee, and the late George Wehrwein, Professor at Wisconsin. All of us appreciated that the regional land tenure conferences we were helping to sponsor did not achieve the purposes of improving individual research as rapidly as was desirable. There was need for bringing together a small group, for a period sufficiently long to provide an opportunity for them to become really acquainted and to take an active part in discussions. A two-week workshop seemed to offer possibilities. It would provide stimulation for group discussion, offer opportunites for individual conferences about specific problems, and furnish a well-rounded program of experience through the interplay of professional, recreational, and social contacts. It would advance the understanding of research methodology and economic theory and indirectly would improve research in land tenure.

The ability to communicate with one another is improved as people become acquainted. A real effort should be made for good fellowship. To do this families of the participants have been invited and urged to attend so that a feeling of relaxation and well-being can be attained. Singing and general jollity around the dinner table, campfire, or beach contribute to the ability to communicate with one another and give a feeling of relaxation, confidence, and security, which is important to personal as well as professional life. This ability to communicate with one another helps inattacking the real problems, situations, or interests of the various participants. In order to induce this relaxation of mind which helps in the exploring of new avenues of approach, it seems well to have the

meeting at a place located away from institutions and the hustle and bustle of the busy city in an area which provides recreation and yet does not distract participants from the problems under investigation.

As originally conceived, and as the workshops have materialized, it is very important to have a program balanced between discussion, recreation, and individual meditation. The program is recommended by a planning committee after the critical and suggestive report presented by an evaluation committee has been digested. Generally, though, the program is informal and flexible enough so that changes can be made as work progresses and as the steering committee (which meets daily during the workshop) sees fit. The idea is to have the greatest possible interest and participation by all who attend.

After the first land tenure research workshop, which was held in 1945 with six men taking part to see what could be done, a proposal was made to the North Central Land Tenure Committee and to the directors of the agricultural experiment stations that a workshop be held in 1946. It was suggested that younger workers in agricultural economics be invited. Such a workshop was held at Land O'Lakes, Wisconsin, in 1946 and 20 men attended. The major emphasis was upon principles of research methodology with a minimum emphasis on subject matter. The participants were unanimous in their decision that another workshop be held, and in 1947 a group of 21 men met at Holiday House, Eldon, Missouri. Again emphasis was upon research theory but more time was given than in 1946 to the application of theory to specific land tenure problems. Time was spent on the matter of conceptionally analyzing the problems, setting up the problematic situation, and stating the working hypotheses. It was felt, however, that considerably more needed to be done in the application of the principles of methodology to specific problems. Therefore, at the 1948 workshop held at Science Camp University of Wyoming and attended by 30 men, emphasis was given to the application of methodology to the planning of a project.

The North Central Farm Management Research Committee recommended that a workshop be held to emphasize the use of farm records in research work. This was done this past summer and attended by 21 men. As plans developed, it seemed that emphasis should be on research methodology.

I would like to emphasize that methodology as discussed at these

workshops is not something fundamentally different from that used by agricultural workers in the past. It is primarily a shift in emphasis. Major attention is placed upon the need for a complete conceptional analysis of the problem prior to actually doing any field work or gathering any data. More emphasis is given to the planning stages, defining the problem, and formulating the hypotheses. More thorough planning results in narrowing the problem so that it is manageable and understandable. This makes possible a better analysis of the problem and more accurate interpretation.

In addition to the land tenure and farm management workshops, the Farm Foundation has contributed to and participated in a number of workshops arranged by the Extension Service of the United States Department of Agriculture. During the past five years the workshop technique has been used a great deal and at an increasing rate by extension people for an intensive study of their problems. Three workshops for administrative leaders have been held; the first in cooperation with the University of Minnesota was in 1942; the second, at the University of Wisconsin in 1946; and the third, in cooperation with the University of Louisiana in 1948. These workshops provided a convenient, stimulating means of interchanging ideas and practical administrative experience in the solution of common problems of management and operation confronting administrators.

In addition, the Farm Foundation has participated in and contributed financially to a home demonstration leaders workshop held at Purdue in 1948. Emphasis was on: (1) administrative responsibilities assigned to state home demonstration leaders and personnel for home demonstration work, (2) program development, (3) educational programs in newer fields, (4) evaluation of home demonstration programs, and (5) organization of county and community to reach more people.

We also assisted in arranging and participated in a week's workshop on farm and home planning, held at the University of Illinois in 1948. Consideration there was given to making a farm and home planning approach to extension better understood.

We have also participated in the Northeastern Extension marketing workshop held at State College, Pennsylvania, April 19, 1948 and will participate in the Midwest marketing workshop to be held at Ames, Iowa, October 1–7, 1948.

A workshop is really a way of learning and living together—of

sharing democratically. Out of the experiences of the workshops held during the past three years somewhat of a pattern has developed which offers real possibilities. Each morning, except Sunday, an intensive four-hour session is held, sometimes for the groups as a whole and part of the time for subcommittee work. In the afternoons individuals get together for discussions and recreation. There are one or two night sessions during the period of the workshop. In addition one or two afternoons are spent in visiting farms in the area.

Working in a group helps to clarify problems and to delineate fields of research. A great deal of planning prior to the workshop is necessary, so that all of those in attendance have an opportunity to give some thought to the problems before their arrival. If one is to intelligently discuss problems with others, it is necessary to think through just what one hopes to accomplish and to explore the broad, basic principles that have a bearing upon the problem. By conceptionally analyzing a problem before beginning to investigate, one is more likely to arrive at an accurate answer to the problem. Group thinking applied to research problems gives a balanced approach to the basic aspects of theory and facts.

THE 1946 AND 1947 LAND TENURE WORKSHOPS

MAX MYERS
South Dakota State College

THE Land Tenure Workshops have sometimes been called an experiment in the application of the workshop technique to agricultural economics. If that is true, then this member of the panel can be considered to have served as one of the experimental animals in the experiment, and one which survived three years of the experiment without contracting anything more fatal or serious than an enthusiasm for workshops.

My mission here is to describe briefly the 1946 and 1947 Land Tenure Workshops. These will be discussed in that order and each will be treated under three topics, namely: Planning and preparation, actual conduct of the workshop, and lessons learned.

1946 Land Tenure Workshop

Planning and Preparation: In the thoughts of the planning group which set up this full-scale land tenure workshop was the purpose to help those working in land tenure research to do a better job. It was decided to hold the meeting of such research workers at a place where interruptions would be at a minimum and where close personal relationships could be developed. It was felt that the group should be limited in size to permit free discussion. Invitations were sent to directors of experiment stations to name or suggest research workers from their states. The actual administrative work of obtaining the personnel and of making the arrangements for the camp were handled by the Farm Foundation.

Actual Conduct of the Workshop: Twenty participants representing 12 States, the Bureau of Agricultural Economics, and Farm Foundation, met August 12–24, 1946, at Deer Path Camp, Land O'Lakes, Wisconsin. Some participants brought members of their families so the total group numbered 51 people. They lived in cabins, ate at the camp dining room, and shared the northwoods recreational opportunities.

Sessions were held daily from 8:30 A.M. to 12:30 P.M. Committee meetings and discussions of individual projects were carried on during afternoons and evenings. The schedule for the morning sessions included:

Historical Developments of Land Tenure Research	4 hours
Theory of Research	8 hours
Research in Farm Tenancy	12 hours
Research in Farm Ownership	12 hours
Collective Tenure	4 hours
Report on South Central Regional Project	4 hours
Committee Reports and Summary	4 hours

The workshop proceeded on an informal basis. Leaders chosen prior to the meeting had made preparations and were responsible for carrying the program along but the program was flexible and the desires of the group directed the discussions. The chairmanship and committee assignments were so allocated and rotated as to encourage participation by all. Of the 20 participants 10 led discussions, 10 served as chairmen of meetings and 14 served as leaders or secretaries on subcommittees. Varying methods and approaches were used by the different leaders. Bulletins were analyzed, project statements scrutinized, current projects reported, procedures outlined, bibliographies distributed and information exchanged.

Problems arising at the meeting caused the appointment of three subcommittees to consider, respectively, (1) the field of land tenure research, (2) criteria to use in analysis of land tenure research, and (3) additional information on land tenure needed in the U.S. census. A fourth subcommittee was appointed to appraise the 1946 workshop and formulate suggestions for a 1947 session.

Lessons Learned at the 1946 Workshop: The participants agreed without exception that the workshop was very worthwhile and that another should be held in 1947. It was felt that the choice of a rather isolated location where the workers and their families were thrown together to permit a good deal of informal discussion and thinking about land tenure research had been justified. Criticisms of the workshop seemed to center about the need for more practical application of the theory of inquiry which had been discussed. It was suggested that time might be devoted to subcommittee preparation of actual project statements or plans of work.

1947 Land Tenure Workshop

Planning and Preparation: The report of the evaluation committee at the 1946 workshop laid the groundwork for the action of a planning committee which in the autumn of 1946 started preparation for the next workshop. Several rather informal committee meetings were held to develop suggestions for presentation to the

North Central Regional Land Tenure Committee which again decided to sponsor the workshop. Copies of the 1946 report were sent to the directors of agricultural experiment stations who were asked to make suggestions for participants to attend in 1947. An agenda was developed based on the suggestions from the participants in the 1946 workshop. Farm Foundation again handled the physical arrangements of selecting a location and sending out invitations to participants. Those selected as discussion leaders sent material and suggestions to the participants before the meeting.

Actual Conduct of the 1947 Workshop: This workshop was held August 11–23, 1947, at Holiday House, Eldon, Missouri. There were 21 participants who represented 15 states, B.A.E., and the Farm Foundation. This group and members of their families occupied cottages and rooms in the lodge, and ate in a common dining room, overlooking Lake of the Ozarks.

The meeting procedure followed was similar to that of the year before with meetings in the morning and committee sessions and informal discussions mixed with recreation in the afternoons. The agenda for the formal sessions included the following:

Scope and Content of Land Tenure Research	4 hours
The Theory of Research in Land Tenure, including methodology criteria for evaluation of methodology analysis of completed projects, and procedure in development of a new project	16 hours
Tenure Problems Ahead	4 hours
Practical Application in Subcommittees of Method previously discussed	12 hours
Philosophy and Purpose of Regional Land Tenure Research	4 hours
Implementation of Research Findings	4 hours
Evaluation of the Workshop	4 hours

As at the previous workshop informality was stressed. In order to encourage participation in discussions each member was assigned several positions. A total of 8 men led discussions, 11 served as session chairmen. In addition the entire group was five times divided into three or four working subcommittees making a total of 18 subcommittees so that each participant had numerous opportunities to work and express himself. This effort was sufficiently successful that it was frequently difficult to distinguish the discussion leaders from the others at any given session.

In addition to the regular meetings one evening was devoted to a presentation, the F.A.O. study on land tenure in foreign countries. One afternoon was spent visiting farms which were being improved

under the Missouri Extension Service Balanced Farming Program. Finally a great deal of the value of the workshop came from the conferences and interviews which went on whenever the regular sessions were not in progress.

Lessons Learned at the 1947 Workshop: There was general agreement that the 1947 workshop was even more successful than the very worthwhile 1946 meeting. The improvement was attributed to a somewhat more logical sequence of discussions, to an agenda which carried the group farther into research procedure, and to the use of subcommittees to attempt practical application of theoretical method. However, the principal criticism was that there had been too many subcommittee assignments, and too many extra sessions in order to prepare subcommittee reports.

This group which recognized unanimously the value of the Land Tenure workshops and felt that there had been an improvement between the 1946 and 1947 versions recommended that another be held in August 1948, preferably in the Rocky Mountain area, and that the major subject matter emphasis be placed on practical application of methods of collecting and processing evidence.

THE 1948 LAND TENURE WORKSHOP

MAX M. THARP
Bureau of Agricultural Economics

THE 1948 workshop was attented by 30 social scientists. They included chiefly land economists, farm-management specialists, and sociologists. The majority of the participants were research workers actively engaged in specific research studies; a few were research administrators. These workers came from 23 States, the Department of Agriculture, and the Farm Foundation. Including their families, about 70 persons were present at the workshop, and in addition several visitors participated in special aspects of the endeavor.

In many respects the program was similar to those of previous workshops. Four hours each morning were allotted to intensive work in committee sessions. The afternoons were given over to daily meetings of discussion leaders, small group conferences, individual study, some committee work, field trips, and private consultations. Two evening meetings were held to discuss two experiments in farm land tenure—the Iowa State College Agricultural Foundation farms and the Bluebonnet farms of Texas, which were recently assigned to the State Agricultural College.

The twelve 4-hour morning sessions (Sunday was not included) were utilized as follows:

Introductions and general organization	1 hour
Current research studies in land tenure	1 hour
Theory of inquiry and research methods	6 hours
Criteria for evaluating research projects	5 hours
Preparation, reporting and discussion of work outlines on 5 subjects	31 hours
Special questions on method	2 hours
Evaluation of the 1948 workshop	2 hours

The 5 subject-matter outlines, which formed the core of the 1948 workshop, were concerned with: (1) public lands, (2) land ownership, (3) landlord-tenant relations, (4) national policy, and (5) legal aspects of tenure. The last subject was added when it was found that a larger number would attend the workshop than was originally anticipated. This addition was necessary to prevent the working committees from becoming too large.

The basic plan of the 1948 workshop was to lay out in logical

sequence a part of the theory of inquiry and to present ideas as to applicable research methods and techniques. Working in small groups, these ideas were applied conceptually to 5 crucial tenure problems in the development of a work outline. The processes followed and the problems encountered in the development of the work outlines were then reported to the entire workshop. The group as a whole offered advice and guidance in adjusting, amplifying, and reexploring the theoretical concepts involved in the processes of formulating the 5 work outlines.

Emphasis was placed upon the thought processes involved in the use of available descriptive information in the presentation of the general problematic situations out of which arise specific tenure problems; in isolating and formulating specifically the crucial problems involved; in developing hypothetical solutions to the problems so defined; in selecting evidence needed to test the hypothetical solutions; in gathering and processing the evidence; and in reporting and implementing the findings. These steps guided the conceptual analysis, but it was found impossible to complete in final form each phase of the job in respective order. Problems were redefined as new light was shed on the situation when committees were working on the hypotheses and considering the evidence needed. The hypotheses were restated as possible solutions fell under the scrutiny of the evidence likely to be found. The process was one of going back and forth all along the line to reshape, adjust, amplify, clarify, delete, or add when necessary as the conceptual analysis proceeded toward the possible assumed findings. As the work outline progressed, it was found necessary to stop frequently to state a presupposition—something assumed by the researcher—and to indicate what items needed to be held constant.

The 1948 workshop was built upon experience and knowledge gained at previous meetings. It was similar to former workshops in that the theory of inquiry and the consideration of criteria previously discussed were used and carried a step further. Small working groups endeavored to apply these ideas to the development of specific work outlines. It was dissimilar to previous workshops in that considerable thought was given to project selection and development of criteria to guide this job; bulletins were not reviewed and evaluated as had been done in the past in an endeavor to shed light on research methods; greater emphasis was placed upon the selection, assembling, and processing of evidence; and

more time was available to consider the processes followed in the conceptual application of theory to specific land tenure problems.

Some of the items stressed at the 1948 workshop that deal with research methods and techniques may be summarized briefly as follows:

(1) There is a vast difference between a project statement prepared for administrative purposes and a work outline or plan of work prepared to guide the researcher as he goes about his undertaking. In the workshop, it was the latter that received primary consideration.

(2) A complete conceptual analysis is necessary before the major evidence needed in the study is determined upon and its assembly undertaken.

(3) The conceptual analysis should follow a logical step-by-step process from a description of the problematic situation through isolation of the problem, formulation of hypotheses, selection and assembly of evidence, analysis of the data uncovered down to and including the reporting and implementing of the findings.

(4) Throughout this conceptual analysis it is necessary to do a sort of spiral or circular thinking, a going back and forth from step to step, always progressing upward, continually redefining, reshaping, and improving the analysis as the thought process leads to a better conceptualization of the whole research undertaking.

(5) It is impossible to attain perfection or to follow rigidly a preconceived sequence of steps. Research methods can never become cut and dried, nor can they be developed into a formula that can be handed to an inexperienced worker to be followed without deviation and further thought.

(6) One primary aim is to segregate the strategic relevant factors into a particularized situation. The work of the researcher is well along when the problem has been isolated and completely defined. As a rule he needs to refine, reduce, and confine the problem in order to present clearly the crucial issues; in other words, he needs to pin-point the problem, then put it under the mental microscope to examine minutely its various parts. This process is essential to the formulation of well-grounded hypotheses.

(7) Selection of relevant evidence is comparatively easy when the problem is carefully defined and clear-cut hypothetical resolutions are determined. Research in social sciences cannot depend upon a poorly formulated problem and hard work to guide purposeful

social action or to push out into new frontiers of knowledge. The researcher cannot let the facts speak for themselves. They never do this; they always speak for or against something.

(8) The research worker needs to keep clearly before him all basic assumptions or presuppositions upon which his study is predicated. He has the responsibility of stating clearly all such presuppositions as well as the factors held constant in reporting his findings.

(9) A rigid, logical, conceptual analysis will reduce costs of research significantly and will improve its quality immeasurably.

(10) Reaserch findings in land tenure can be fully tested only in the field of actual experience. This must be recognized, for social scientists cannot control all of the factors that impinge upon a given situation as can physical scientists.

Final answers as to how a workshop on research methods should be conducted are not known. However, it is possible to generalize tentatively from past experience and some of the ideas may be of value to anyone planning a research workshop. The following items appear to be the more pertinent:

(1) All available techniques should be used to obtain maximum participation by each and every participant. Some procedures that have been used and found helpful are: (a) self introduction, (b) a brief report on the individual's own research or that of the state or agency he represents, (c) frequent rotation of chairmanship and secretaryship, (d) constant endeavor to maintain a workshop, not a classroom atmosphere, (e) elimination of any distinction between discussion leaders and other participants, (f) frequent separation into small working groups of 5 or 6, (g) assembly around a table that will facilitate discussion, (h) meals in a common dining room as near as possible, in family fashion, (i) use of first name or nickname to help along the idea of informality and (j) means of securing punctuality.

(2) Be careful not to overorganize the workshop—keep it flexible, adjustable, and simple; evaluate the process from day to day and from year to year; set up guide posts but do not establish a guard rail.

(3) Do not plan extensive preparation by the participants but select leaders who will be prepared to perform the duties required of them; keep to a minimum the materials sent out to participants, and send them before the meeting date.

(4) Isolate the workshop insofar as possible from outside in-

fluences such as telephones, radios, newspapers, and other professional activities. Isolation depends chiefly upon selection of a meeting place well away from urban influences. An ample assembly and recreation hall is to be desired, and separate space for each major committee is necessary. Housing should expedite rather than make difficult interfamily association.

(5) Try to center activities on constructing or building—on doing or applying techniques to practical situations. Have no formal papers or presentations, no student-teacher relationships. Try to get everyone to participate on an equal basis.

(6) In the construction or work activity stress thought processes, ideas, and conceptualization rather than specific end products. The objective should be to affect the way in which people do things and how they think together, not to stress the completion of a work outline on a given subject or some other specific task. A research workshop should be concerned primarily with methods and techniques rather than with subject matter. Research methods, not land tenure, were stressed at the workshop. However, constant vigilance was necessary to keep illustrations in the field of land tenure rather than engineering or the physical sciences.

(7) Participants should be chiefly active research workers, including those in graduate training. It is desirable also to have present a few administrators and others who have special qualifications or interests.

Many problems have not yet been solved. Perfection has not been attained—far from it. It is recognized that the job will never be completed, for when growth and change stop, stagnation and decay set in. This should not happen. We are convinced that many minds, working from many angles, are essential if we are to make the progress desired in our social science research. This progress can be expedited by constant interchange of ideas and by working and thinking together. Progress has been made, but only the first lap of the journey has been completed.

THE 1948 FARM MANAGEMENT WORKSHOP

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Michigan State College

THE first workshop in farm management research methods was held this year. The suggestion for holding a workshop was made by the farm records subcommittee of the North Central Farm Management Research Committee. It was the opinion of this subcommittee that since most states in the region were doing considerable work with farm records, it would be a good idea to get together for a review and study of research methods being used. The plans for the workshop, as developed, however, were broadened and more than farm records were included in the agenda.

The farm management workshop had three major sections. The *first* of these was a summary of recent farm management research in the North Central States, with a review of the research methods used. The *second* section was on the theory of research and the scientific development of research projects in farm management, with an analysis of two published bulletins considered from the standpoint of the research procedure discussed. The *third* part of the workshop was the actual development of a research project outline on a subject of interest to those in attendance.

Two days were devoted to the first section of the program. During this time a report was made showing recent research projects by states in the region, classified by topics, the same as in the Social Science Research Council, Bulletin 52. This report also showed for each of the projects the source of data, the amount of time being spent on it, date started, date of completion and project leaders. Also presented at this time was a bibliography of farm management publications by states in the region up to the present time, along with a listing of current research projects. The review of methodology used in recent farm management research covered: (a) the general method followed, (b) the organization of the project, (c) method of analysis, (d) statistical techniques used, (e) trends in research procedure, and (f) criteria for determining methodology. The evaluating committee of the workshop was of the opinion that this part of the agenda served the very useful purpose of informing the group of the work being done in the region, and laying the ground work for the program that was to follow.

The next two days were spent on the theory of research and re-

lated questions. Several publications on the subject were referred to, among which were "Logic, the Theory of Inquiry," by John Dewey, "A Critical Review of Research in Land Economics," by Leonard A. Salter, Jr. and "An Approach to Research Methodology in Agricultural Economics," by K.H. Parsons. The importance of developing one or more hypotheses in the solution of research problems was stressed. The error of generalizing from limited facts or relationships was pointed out. The importance of knowing the nature of the population, the representativeness of the sample, and the probability of the same results being obtained in a second study were emphasized. Statistical techniques can contribute to more sound analysis of relationships that frequently has been done in the past. Many farm management problems, however, are complicated interrelationships, the solution of which is beyond statistical procedures now developed. The evaluating committee felt that this section was very valuable and deserved more time.

After two days on theory, the next two were spent in a critical analysis of a bulletin on "Farm Practices" and one on, "Factor Analysis." The workshop group was divided into two or three subgroups for consideration of the bulletins, then reports were made to the entire committee. The major questions raised on the two publications were: was there a statement of purpose or objectives of the study, were there general or specific hypotheses stated or implied, what assumptions were made, was the sample such that the results could be duplicated, was the method of analysis used statistically sound, and were the conclusions drawn warranted from the data? The evaluating committee was of the opinion that we probably went into too much detail and spent more time on this part of the program than should have been. One day spent in a general analysis of a bulletin, however, would be a fruitful experience.

Most of the next five days were devoted to the actual working out of a hypothetical research project outline on a farm management aspect of soil conservation. The first phase of this activity was *planning* the *project*. This took one day. After much discussion two general hypotheses were selected. Then we carefully described the conditions or assumptions under which the study was to be made.

The second phase of this part of the program was a consideration of the information needed to test the hypotheses. The questions of not only what information was needed, but where and how could

it be obtained, were discussed. Could experimental data be used? Could information from farm records be applied? How about surveys or case studies of carefully selected farms? Did budget analysis have something to offer in testing the hypotheses? These questions caused lively discussion.

The next phase of the job was analyzing the evidence. Experience in this aspect of research was obtained by each of the four subgroups taking two sets of data which were supplied, and for each one, setting forth the hypotheses, the assumptions, and the suggested method of analyzing the data. This was followed by a discussion by Paul Homeyer, from the Ames Statistical Laboratory, and Earl Heady, who had prepared the example sets of data. There was considerable discussion of statistical techniques, the place of statistics in such analysis, and the desirability of farm management men working with statisticians and research workers in other departments on related problems.

Formulating the conclusions was the last phase of this activity. It was pointed out that the data may (a) prove the hypothesis, (b) disprove it, or (c) prove that a different hypothesis is needed. The subgroup took a Minnesota bulletin and from data presented in three tables tested the conclusions presented or tried to develop new conclusions. In the discussion following the report by the subgroups, Paul Homeyer, the consulting statistician, stressed the difficulty of isolating the influence of one factor from data of the kind frequently used. He thinks it would be worthwhile to assume data and try to work out theoretical solutions. The above concluded the agenda of the workshop except for the report of the evaluating committee and two or three meetings on regional research projects being submitted for consideration as Hope-Flannagan projects. The two being developed were: "Economic Aspects of Farm Mechanization in the Midwest," and "Economic Aspects of Soil Conservation in the Midwest."

Perhaps some of the comments, questions and suggestions of the evaluating committee on the workshop might be of interest to this group. In regard to a general evaluation of the workshop as a whole, the committee felt that without question this workshop was very profitable to the participants. After our experiences there in the two weeks, during which time most of us gave more thought to research methods than in a long time, we are of the opinion that all of us will be more critical of our own methodology and will give

careful consideration to new research projects. This workshop provided a wonderful opportunity to discuss our problems and was a very fruitful experience. We recommend that there be a second farm management workshop next year, and the experiment station directors have approved the idea.

In regard to the next workshop, the committee suggested that it be held at a resort, institution, hotel or other isolated meeting place, with meetings scheduled four hours in the morning and the afternoon left free for informal conferences and study. The bringing of families is to be optional. In view of the wide variation in the share of the participant's expenses paid by the different institutions, and the attitude of some directors that workshops are vacations, it behooves us to point out that ours is a relatively new field with greater need for development of research methodology than many of the long established departments. If some of the directors continue to feel that the workshop, as now conducted, is not sufficiently full-time business, then I think it would be wise to change the plans slightly, if necessary, to increase the moral and financial support by our directors, and in the meantime do our best to sell them on the great benefit derived by the participants, and their departments from the workshops. Personally, I feel that the two weeks spent at the workshop probably will improve the farm management research at Michigan State College more than anything I have done recently

ROUNDTABLE ON OPERATION OF THE RESEARCH AND MARKETING ACT OF 1946

Chairman: Noble Clark, University of Wisconsin

ADMINISTRATIVE PROBLEMS AND POLICIES OF THE RESEARCH AND MARKETING ACT OF 1946*

HARRY C. TRELOGAN
Research and Marketing Act

THE leading administrative problem posed by the Research and Marketing Act just a little over a year ago was one of launching a large, new research and service program for agriculture under somewhat adverse conditions—not the least of which was the fact that the Act had been passed fully a year earlier and had received well over a year of advance billing. Considerable effort had been made to plan a program during the year that intervened between the passage of the Act and the first appropriation for it. These efforts were severely handicapped by uncertainty with respect to when and how much money would be available. This particular handicap was aggravated by the fact that an appropriation was not passed until a month had elapsed in the fiscal year in which the program was to be initiated. Prior to that time no tangible program could be arranged, no commitments could be made, and no obligations could be incurred. Nevertheless, a sufficiently definitive program had been mapped out both within the Department of Agriculture and by the state experiment stations with respect to Title I, Section 9 of the Act to permit the beginning of actual research and service work within a matter of weeks after the appropriation became available.

All of this advance work had to be accomplished with voluntary assistance from advisory groups and with borrowed part-time help to serve as an administrative staff. This staff had to be almost completely reconstituted and enlarged when the program was activated and definite assignments could be made. One result of the long advance notice of the forthcoming program was a large accumulation of ideas for work and of project proposals that sought

* A paper presented before the Annual Meeting of the American Farm Economic Association at Green Lake, Wisconsin, September 14, 1948.

financing. It presented at once a tremendous task of selection of work and allocation of funds. Most of the proposals presented were originated by persons or agencies acting independently or giving relatively little thought to the prerogatives or interests or responsibilities of other agencies which were expected to participate in the funds. There was, therefore, little that could be identified as an over-all program or plan other than the Act itself. A difficult problem of integration or coordination immediately confronted the Administrators, especially in view of the fact that the Act emphasized the need for such coordination and integration. An approach to the solution of this problem was to assign definite coordinating responsibilities to established agencies within the Department of Agriculture. The policy has been, for example, to refer to the Bureau of Agricultural Economics every project proposal involving economic research for review from the standpoint of coordination with other economic work.

Many of the proposals received for consideration contemplated the expenditure of large amounts of funds. Persons presenting the proposals were evidently encouraged to think in terms of large programs of activity by the authorized appropriations that appeared in the Act which amounted to over sixty million dollars a year in the course of five years. This large figure left an impression on persons planning research which has proved to be unwarranted in the light of the differences that are appearing between authorizations for appropriations and actual appropriations of funds.

Under these conditions the work was launched just a little more than a year ago. Many improvisions were resorted to in the interest of getting effective work under way promptly. Numerous mistakes naturally resulted, but none of them has proved to be of a serious character, and they appear to have been out-weighed by the gains made in getting productive work started with widespread participation along the courses intended by the legislation. Because of the attention that had to be paid to promptness in initiating the program in the short time available, numerous problems have been only partially solved or remain for further attention.

At the moment, as we enter the second year of active work under the Research and Marketing Act, the one problem about which all others tend to center is the fact that the demands for work are far greater than can be financed or adequately staffed. In fact, there aren't sufficient resources available at this time to undertake the

research and service proposals that have been classified as urgent by advisory committees, legislative committees, and research agencies. As the actual appropriations for the Act are below the authorizations for appropriations, the problem of selection is made considerably greater than it might otherwise be because plans continue to be made and presented on the basis of authorizations. Consequently, one of the continuing difficult administrative problems is that of selecting and curtailing the work to fit the pattern of the actual appropriations.

An important aspect to this problem is that of dispelling ideas that are abroad to the effect that there is a vast fund available to be tapped if one just manages to get a project on paper in the proper technical form and present it to the proper place or to the right people. The point has to be made that the preparation of a project meeting all technical requirements pertaining to form and content represents only the first and perhaps the easiest step in getting work approved under the Act.

Problems arising from limitations of funds available may be broken down into two parts. One involves efforts to acquire more funds, and the other involves efforts to make the most efficient use of the available money. In general, the policy thus far has been to pay more attention to the second of these alternatives on the theory that a good record of performance would be most effective in attracting more adequate appropriations. Nevertheless, considerable administrative time must be devoted to the preparation of budgets and presentations of needs for funds to the budgetary agencies of the Government and the appropriate legislative committees of the Congress.

New Problems

Beyond these problems of a general nature, there are several more specific items that merit attention in a discussion of this sort. It must be recognized that the Act presents several new and unique administrative problems. These have to do with such items as advisory committees, contractual research, and regional research which are provided in this Act for the first time.

Each of these items might be regarded as part of the larger proposition that the Congress has in the Research and Marketing Act of 1946 left more latitude for administrative decision in the allotment of funds than has heretofore been true with respect to ap-

propriations for agricultural research and service work. Actually under this Act only a relatively small portion of the funds is distributed by formula to specified agencies. Virtually all of the funds so distributed are provided for in Title I, Section 9, specifically in Sections 9(b)1 and 9(b) (2) of the Act, which pertains to State Agricultural Experiment Stations. The remainder may be allotted administratively under several sections of the Act, each of which has different purposes and limitations and, indeed, separate appropriations.

An observation meriting reiteration at this point is that the Research and Marketing Act of 1946 is a complex Act comprised of several parts that have to be treated as separate entities. These parts (see Sections 9, 10(a) and 10(b) of Title I and Title II in its entirety) evidently had their origin in different bills that had been presented to Congress and were either incorporated in the Act or were withdrawn in favor of the Act. In the administration of the Act it is necessary to keep these parts distinct and also to distinguish between work conducted with funds provided by the Act and work conducted with funds from other appropriations. There is a constant problem of acquainting applicants for funds with the limitations involved and of properly classifying project proposals.

A natural result of the complexity of the Act is variation in emphasis placed upon different types of work encompassed by the Act. Along with this is a variation in interpretation of what is involved in different types of work. Definitions pertaining to utilization, marketing, and regional work are left largely to administrative rather than legal decision. Many of these have to be arbitrarily established, taking into account the relationships between parts of the Act and legislative history. A reasonable balance between commodities, between natural and social sciences, and other classifications must be maintained.

Advisory Committees

Considerable reliance is placed upon advisory committees in obtaining recommendations that will aid in arriving at decisions on these points and also in the selection of work to be undertaken. The provision for advisory committees in Title III of the Act is unique in agricultural legislation. Consequently, much interest is evidenced in how they operate.

The National Advisory Committee, which is specifically required

by the Act, is comprised of 11 members, 6 of whom represent farmers or farmer organizations. This committee, which meets quarterly and does not have any alternate members, devotes its time to consideration of general policies pertaining to the Act. A comprehensive statement of the policies it has recommended was issued through the facilities of the Department of Agriculture on April 22, 1948. This statement makes clear the type of problems which occupy the attention of the Committee.

One of the first recommendations presented by the National Advisory Committee was that commodity and functional advisory committees should be established to make recommendations relevant to specific fields of work to be conducted under the Act. Accordingly, 22 such advisory committees have been established, 19 of which cover commodity fields, and 3 non-commodity or functional fields, such as transportation, cold storage, and foreign trade. With few minor exceptions each of these committees is constituted in the same manner as the National Advisory Committee—that is, with 11 members, no alternates, with 6 members representing farmers or farmer organizations.

Some difficulty has been encountered in establishing the functions of these committees and all of them have not operated in the same way. The foremost problem has been to define the advisory function of the committees as distinguished from the function of making administrative decisions. In general, this problem has been satisfactorily settled, and the committees have devoted their attention to the recommendation of problems meriting favorable consideration for research and service work. To perform this function, the committees have had to make comprehensive reviews of the problems confronting producers and distributors of the agricultural commodities with which they were concerned and rate these problems in the order of their importance. They have been assisted in this review work by counter-part groups appointed within the Department of Agriculture called working groups. The working groups are comprised of representatives from each agency of the Department concerned with the type of work being considered by the committee. For example, the Dairy Working Group, which works with the Dairy Advisory Committee, includes a representative from each agency which deals with problems of production and distribution of dairy products. In every instance, the working group prepared for the benefit of the advisory committee a com-

prehensive report outlining the potential problems that might merit consideration for research and service work. The advisory committees have, in general, reviewed these reports and made their recommendations to the Administrator of the Act, listing the major problems with some indication of their classification in terms of importance and type with respect to their relationship to production or marketing. A continuing problem confronting these committees is one of becoming thoroughly acquainted with the research work that has been and is being done in their respective fields with funds other than the Research and Marketing Act funds by both public and private agencies.

In most instances, the advisory committees have recommended publication and distribution of the reports prepared by the working groups. In all instances recommendations prepared by the advisory committees have been distributed to interested agencies. While it is recognized that the recommendations presented to the Administrator by these advisory committees do not impose obligations on the Department or other research or service agencies to perform the work, it is felt that these recommendations may be distinctly beneficial to all agencies concerned with the planning of research and service work. These recommendations receive serious consideration when projects are initiated and prepared by many agencies, especially the Federal research bureaus, and the Administrators of the Act take them into account when they make selections for the allotment of funds.

Contracts

Another new feature of the Act is the provision whereby the Secretary of Agriculture may contract for research and service work with agencies outside the Department of Agriculture. This permits wider participation in the Act and enables the Department to tap research and service resources that it cannot itself provide. The policy has been to use contracts where they will make it possible to use personnel and facilities that cannot be readily duplicated and thereby increase the tempo of work. Contracting has to be done in accordance with the terms of the Act which require that the work be performed more effectively and more rapidly or at less cost than if performed by the Department of Agriculture. Experience thus far has indicated that the problem of contracting for research work within the confines of governmental

regulations is extremely difficult. Measurement of performance of research, for example, is nebulous compared with the measurement of production of tangible items or performance of services for which most Government contracts are let. This provision for contracting research, however, is regarded by the Administrators as very desirable and one that must be guarded so that the privilege will not be jeopardized.

Regional Research

The provisions for cooperative regional research under Title I, Section 9b3 is another entirely new development in terms of Federal legislation, even though the regional approach to many problems has been applied in the past by groups of States and Federal agencies concerned with a common problem.

Development of policies related to the regional research program has been delegated for the most part to the Committee of Nine specified in the Act to represent State Agricultural Experiment Stations. The Committee of Nine has leaned heavily upon the regional organizations of Experiment Station Directors for assistance in planning and directing the program of work which it has recommended to the Secretary of Agriculture for approval. Without going into detail, it appears that the Committee of Nine has encountered formidable problems similar to those encountered with the Act as a whole. Foremost among these has been the problem of selection because far more work has been proposed than could possibly be financed. The first step toward a solution of this problem involves determination of projects that may be regarded as regional in character. Closely allied problems have been those of coordination and integration as well as the achievement of some reasonable balance between types of work and between States within the regional program. There is also a problem, that has yet to be completely resolved, of coordinating regional research with other research conducted by agencies acting independently. In some respects the latter problem is more apparent than real because of the broad titles placed on research projects. A characteristic action of the part of research workers generally is to utilize broad titles and objectives to avoid confinement of their activities by narrowing the scope of projects. The practice leads to serious misunderstanding and misinterpretation on the part of reviewers, especially fiscal agents, legislators and administrators, who detect

in the titles repeated instances of apparent overlapping and duplication.

A real measure of progress toward coordination of Federal and State research has been afforded by the regional program. This has been expedited through widespread participation in the regional conferences by appropriate representatives of State and Federal agencies. Equally as much progress has probably been gained toward coordination of work between State Experiment Stations as a result of these conferences. The Office of Experiment Stations has been instrumental in facilitating the arrangement of these conferences and the exchange of information between State and Federal research workers.

State Departments of Agriculture and Bureaus of Markets

The Research and Marketing Act provides for the first time opportunities for Federal financing of work by State Departments of Agriculture or Bureaus of Markets. Two problems have been outstanding in this phase of the program. One has to do with the delineation of work conducted by these agencies and by State Agricultural Experiment Stations, and State Extension Services. With wide variation in individual State Laws and in the work proposals submitted it has been difficult to stake out or identify a field of work for their participation that is generally applicable. Briefly, the policy has been to approve service projects that do not involve enforcement of State regulatory laws and that are mutually agreeable with the other State agencies.

The second problem has been to achieve some sort of equity in the distribution of funds between States. This particular problem is complicated by the matching requirements of the Act, differences in ability of States to provide matching funds, as well as qualified personnel and facilities, and by uncertainty regarding Federal appropriations for the Act. The latter problem is a grievous one in view of the fact that State Legislatures usually meet biannually and Federal appropriations have not been definitely known before the beginning of each fiscal year.

Extension Services

By comparison, the problem of arranging a workable program with State Extension Services under the Research and Marketing Act has been easy by virtue of the long record of cooperation be-

tween the State and Federal Services. Problems of matching and of distinguishing between the work conducted with RMA funds and with "regular" funds have nevertheless been just as important.

Experiment Stations

The nature and extent of State Agricultural Experiment Station participation in the Title II program remains as an outstanding unsolved problem. While some Title II projects have been started with several States, the arrangements for and the amount of such work have not been satisfactory to either the Experiment Stations or the Administrator of the Act.

Efforts are now being made to delve into this problem and try to find mutually agreeable policies and procedures that will facilitate more such work. Further coordination of Federal and State work undertaken with funds from other parts of the Act will also receive additional attention in the coming year.

Current Problems

This discussion does not permit more than a partial listing of problems and only hasty mention of those that are included. A few problems of a more current nature might be worth mentioning before closing the discussion. With the beginning of a new fiscal year with the funds available, it has been necessary to establish some policies with respect to old and new projects. The policy has been to give priority to a continuation of projects started in the preceding year before undertaking new projects. It was felt that the investment already made in incomplete work should not be lost simply to start different work unless the new work was of an emergency character. This particular policy is less important in its application to Title II which received a more liberal appropriation. It is quite important, however, with respect to the other sections of the Act where the relatively smaller increases in appropriations have tended to cause some curtailment rather than permit expansion of work. This is true because the money available for the last fiscal year was utilized during only a portion of the year. The expenditures were being made at an accelerating rate as the year progressed. Consequently, the new appropriations were hardly enough to sustain the rate of expenditures incurred during the last quarter of the year. Added to this has been the problem of providing for some work that was classified by Con-

gressional Committees, advisory committees, and others as urgent. This has necessitated a definite cutback in some of the work that was started, but in no instance thus far has incompleted work been entirely stopped.

Congress has, through the channels of budgetary hearings, resolutions, and other means, conveyed to the Administrator of the Research and Marketing Act the idea that an expansion of work dealing with costs and margins involved in marketing agricultural products is expected. In part, the more liberal appropriations for Title II may be regarded as a reflection of this attitude. A problem consequently arises in obtaining the proper emphasis on this type of work. There are wide differences of opinion regarding what constitutes acceptable projects in this field, as well as a reluctance to tackle the work in view of the limited number of qualified personnel and the lack of sympathetic cooperation available for such work.

One approach to the encouragement of more effective marketing research and service work has been the initiation of a training program intended to provide more qualified personnel in the future. This program consists of several parts to do with in-service training in the Department of Agriculture, encouragement of summer school courses in the State Agricultural Colleges, and efforts to obtain greater emphasis on marketing courses in the future. These activities are being organized with committees appointed through the good offices of the Land-Grant College Association, and it is hoped that they will yield beneficial results before very long.

In the meantime, the problem of meeting the demand for additional or more effective marketing work presents a challenge that will tax the imagination and ingenuity of agricultural workers generally. It must be regarded as an obligation to be accepted under the Research and Marketing Act. It is an obligation that must be shared by Federal and State agencies, by natural scientists and social scientists, and by educational and service workers. Agricultural economists have a real part to play in this endeavor. Although the responsibility is not theirs alone, they should have a contribution to make in whatever capacity they may be serving whether it be college professor, public or private research or service worker, or participant in the marketing system. A sound constructive program will depand much upon their initiative and performance.

OPERATION OF THE RESEARCH AND MARKETING ACT OF 1946: STATE AND FEDERAL RELATIONS*

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THE Agricultural Research and Marketing Act of 1946, frequently referred to as the Hope-Flannagan Act, authorizes a significant expansion of traditional types of agricultural research and specifies new emphases and closer relations with farm, trade, and industry groups. The large fund authorizations in the act, the variety of types of research and marketing work covered, the new emphases specified, and the new forms of administrative organization necessary and implied have caused both widespread interest and confusion among agricultural research workers.

The act is divided into three major titles, the first of which lists a great variety of types of research to be encourgaed and supported. A total of $41,000,000 is authorized in Title I, of which $20,000,000 is included in Section 9 to be allocated to the states, and $21,000,000 in Section 10, of which $15,000,000 is for "utilization" research (Section 10-a) to be conducted by Department of Agriculture laboratories and $6,000,000 (Section 10-b) for cooperative research with state agricultural experiment stations and other appropriate agencies.

Ninty-seven percent of the sums authorized for Section 9 are to be allocated to the states and territories, and the remaining three percent are available to the Office of Experiment Stations of the U. S. Department of Agriculture for administrative expense. Of the ninety-seven percent, twenty percent are allotted equally to each state and territory, not less than fifty-two percent allotted half on the basis of rural population and half on the basis of farm population of each state, and not more than twenty-five percent for cooperative research in which two or more state agricultural experiment stations cooperate to solve problems that concern the agriculture of more than one state. This regional research fund is to be used only for cooperative regional projects recommended by a committee of nine persons elected by and representing the directors of the state agricultural experiment stations, and approved by the Secretary of Agriculture or his authorized representative.

* Paper presented at the annual Meeting of the American Farm Economics Association, Green Lake, Wisconsin, September 14, 1948.

Administration of Title I Funds

Two very significant points should be noted regarding Section 9 of Title I: first, a very definite formula is set up for distribution of funds appropriated so that each state gets a specific amount as determined by the formula; second, that the words "not more than twenty-five percent" are used in the case of funds to be available for cooperative regional projects, whereas the words "not less then fifty-two percent" are used in the case of the funds to be allocated to the states on the basis of their rural and farm population. The formula allocation removes any possibility of political manipulation, or any similar activities in influencing the amounts each state receives. This policy is in keeping with past legislation for agricultural research. This is not the case with Section 10 of Title I or of Title II funds.

The emphasis upon regional research is generally considered to be desirable, although the fact that not more than a fourth of the appropriations may be used for this purpose indicates regional projects should not constitute a major use of Section 9 funds. In other words, it is assumed that most research done under Section 9 will be done on a state basis, and that best results can be expected by this procedure. A great many regional projects have been proposed, and many of them are now in operation. Much travel has been involved by federal and state staff members in planning and executing these projects. Too frequently available funds have been divided equally among the states involved, so that the sums are too small for effective operation. Much criticism and confusion has developed over the regional projects, and the feeling persists that the growth of regional projects should be much more gradual than has been the case with the sudden large expansion accompanying availability of Hope-Flannagan funds. Many feel it would have been wiser to have started with fewer regional projects and with less than the maximum of twenty-five percent of the Title I funds.

The committee of nine should meet with Research and Marketing Administration staff members regularly to discuss procedures and policy on regional projects. A two-day or one-day meeting, semi-annually, with the entire RMA staff or those most informed and concerned, should be helpful in improving the efficiency of regional projects through reduction of excessive travel and numerous federal agency representatives attending regional project meetings, and more effective planning of projects and assignment of respon-

sibility for their execution. The development of a handbook of procedure, establishment of types of projects considered most desirable and appropriate, and a better understanding of the functions and services of federal agency staffs for cooperative work with state staffs should do much to reduce the present major criticisms of regional projects, namely, (1) excessive travel, (2) minute division of funds, and (3) lack of adequate planning and resulting general ineffectiveness.

The only provisions for allocation of Section 10-a funds contained in the act are that the "utilization" research contemplated is to be conducted "so far as practicable" at laboratories of the Department of Agriculture, although provision is made for contracting with public or private organizations or individuals. Nearly two-thirds of Section 10-a funds have been allocated to the Bureau of Agricultural and Industrial Chemistry. In the case of Section 10-b funds for cooperative research with state agricultural experiment stations and other appropriate agencies, the Bureau of Plant Industry, Soils, and Agricultural Engineering has secured the largest allocation. However, there is no formula or any other specific directives for allocation of Section 10-a and 10-b funds. Final authority rests with the Secretary of Agriculture.

The last section of Title I (Section 11) provides that not less than twenty percent of the funds allocated to the states in Section 9 shall be used by state agricultural experiment stations for conducting marketing research projects. It should be noted that the wording is "not less than twenty percent" and indicates that the Congress intended that more emphasis be placed on marketing research by state experiment stations. In many cases, the impression seems to persist that not more than twenty percent of the funds appropriated will be utilized for marketing research, but it should not be forgotten that Congress intended this to be a minimum and not a maximum.

The total funds authorized under Title I are $41,000,000 annually, at the end of five years of operations. This is slightly over twice the amounts authorized in Title II. The research contemplated under Title I covers the whole range of problems in agriculture and related fields, and implies analyzing whatever leads the research may uncover, whether in the field of production, marketing, or general policy. The distribution of funds to the states in Section 9 (approximately half the total of $41 millions) is specifically by

formula; a minimum percentage of one-fifth must be used for marketing research, and not to exceed a fourth may be used for regional projects. Thus, major allocation policy is specifically stated in the act and relationships between federal agencies and state experiment stations are generally satisfactory so far as Section 9 funds are concerned.

Title II Funds

The provisions of Title II are such as to make administration of this part of the act and the resulting relationships between state and federal agencies quite different from those of Title I. In the first place, there is no specific formula for the distribution of funds. Second, the emphasis in Title II is on marketing. In fact, Title II is cited as the "Agricultural Marketing Act of 1946". Third, all three phases of marketing work are emphasized, namely, research, education (demonstrational), and service (information, inspection, and regulatory), but no indication is given of the relative emphasis to be placed upon each phase. $20,000,000 are authorized to be appropriated in Title II, and in Sections 10-a and 10-b of Title I (utilization research in connection with development and application of present, new, and extended uses) there are authorizations for a total of $21,000,000 or a combined total of $41,000,000 for research and other activities pertaining to marketing and to new and extended uses of agricultural products. This compares with only $20,000,000 authorized in Section 9 of Title I to cover the very extended array of problems enumerated in the policy statement.

Even agricultural economists are inclined to admit that this is placing heavy emphasis upon marketing and new and extended uses. All of us know that more efficient marketing will not in itself make the difference between 4-cent hogs and 30-cent hogs, or between 35-cent and $2.00 wheat, or between 5-cent and 20-cent cotton. These prices have occurred under marketing procedures that were essentially identical. The level of industrial employment may be far more important in determining the level of hog prices than methods or organization of the marketing machinery, and prices of cotton and wheat may be influenced far more by national and international trade policies than the specific method used in selling or distributing these products. It is, therefore, of paramount importance that in the interpretation of what constitutes marketing work the projects be broadly conceived and that the

opportunities made available for agricultural and social progress by this act not be lost because of undue emphasis or preoccupation with a single phase of the agricultural problem or even a single phase of the marketing work.

In discussing the act with administrators and staff members of twenty selected land-grant institutions recently, the author found fairly general agreement that there were advantages in not having all authorized funds in Title II allocated by formula to the states or other agencies. Title II constitutes a liquid or flexible fund which should make it possible to allocate considerable sums from time to time, regardless of where such ideas or problems originate so that more complete or effective work can be done in meeting acute problems or unusual and serious difficulties that may arise in agriculture over the years. However, because a specific formula for the allocation of Title II funds is not provided in the act, it becomes imperative that a rather well understood and clearly conceived policy for the administration of Title II funds be worked out, and that as soon as possible.

Basic Principles for Administering Title II Funds

Several basic principles may be advanced for such a specific policy. *First*, a clearly defined policy of about how much of Title II funds are to be used for research, how much for educational and demonstrational work, and how much for informational, inspection, and regulatory work (service) must be developed. The Research and Marketing Administration, with the approval of the Secretary, obviously has final say in deciding this. It would seem that such a policy could best be worked out by a committee which would represent state and federal agencies engaged in these three types of marketing work. The proportions decided upon for each of the three types of work should not be rigid from year to year but sufficiently flexible to permit emphasizing types of marketing work most needed at different times. However, a minimum proportion should definitely be set aside for research as a regular policy, because research is the foundation for effective functioning of the other two phases.

For the fiscal year 1948 approximately seventy per cent of Title II funds were allocated to the Extension Service and the Production and Marketing Administration, including state departments of agriculture and markets. These two agencies are concerned

primarily with marketing educational and demonstrational work, and market information, inspection, and regulatory work, respectively. Many feel this amount is too large for these types of work; some may feel that the proportion is about right; others may feel that a much larger portion should have been allocated for research, divided into three groups: federal bureaus and agencies, private individuals or agencies, and state experiment stations. The fact remains that the act carries no statement indicating the relative emphasis to be placed upon the three phases of marketing work, and policies on this aspect should be established at an early date.

It is apparent that it was the evident desire of the framers of the legislation that the research should lead to a heavier reliance upon private enterprise in solving agricultural problems and less dependence upon action programs, government sponsored, financed and administered. If this be true, the act perhaps does not give sufficient emphasis to research on the broad fundamental problems which relate to the economic and social aspects of various agricultural industries. The emphasis is preponderantly on marketing work and on new uses of products, and implies that an increase in marketing efficiency, together with the development of new uses will largely solve agriculture's most pressing problems.

Second, the Department of Agriculture should have a strong research program, and a considerable portion of the funds appropriated under Title II should be reserved to or made available to Department agencies to attack certain problems which are nationwide in scope or in which the states are unable or unwilling to make the most effective contribution. A strong federal research program is also desirable to give leadership on national issues which states individually cannot give, and to work out more effective cooperative relationships in certain types of research with state experiment stations, including regional research projects. Sweeping reductions of appropriations for federal bureaus by Congress do not contribute toward the building of a competent federal research program. Appropriations for such federal program should not be considered competitive with state programs, but complementary. If all workers in land-grant institutions and state experiment stations were more thoroughly convinced and active in this regard, agricultural research, particularly agricultural economic research, would be more effective today.

Perhaps a third of Title II funds allocated for research should

be made available to Department of Agriculture agencies for research contemplated in this part of the act. Such allocations should not be considered as replacements for the usual congressional appropriations made directly for operation of Agricultural Department agencies. The existing lack of a coordinated administrative organization for research work of the U. S. Department of Agriculture has contributed to the current tendency to use Title II funds as replacements for funds eliminated in the usual congressional appropriations for particular bureaus. The Agricultural Research Administration has largely coordinated the research work of the Department of Agriculture involved in animal and plant science work, human nutrition, and agricultural engineering. However, research work involving economic and social problems of agriculture, including marketing, is now undertaken by at least four bureaus or agencies within the Department—the Bureau of Agricultural Economics, the Office of Foreign Agricultural Relations, the Production and Marketing Administration, and the Farm Credit Administration. Establishment of a research division in the Department of Agriculture to administer all agricultural research, under the direction of an individual with under-secretary rank, might help reduce the confusion and increase efficiency. Such coordination might also help to utilize more effectively the Title II funds.

A *third* principle which should be considered carefully in the establishment of a specific policy or procedure for the utilization of Title II funds is that research which is to be undertaken by federal agencies or bureaus should be done by those whose primary responsibilities, interests, and staff training are in research, both pure and applied. The fact that considerable Title II funds for research have been allocated to agencies in the Department of Agriculture which are relatively new in the field of research, or whose major responsibilities are not research, has caused a great many of the state as well as many of the federal people to feel that the results achieved will not be significant. This has been an important factor in the confused relationships that now exist between the experiment stations and the Research and Marketing Administration regarding Title II funds. It should be pointed out in passing that it would be unwise to exclude completely an agency which is primarily a regulatory or enforcement agency from undertaking or cooperating in any research.

Federal bureaus or agencies undertaking a regular research program should secure a major portion of their research funds directly from congressional appropriations, as in the past. The Research and Marketing Administration has followed this plan and has generally approved allocations for regular federal research agencies only for a new type of work or work which would otherwise not be done through regular congressional appropriations. This is a sound policy. The replacement of regular appropriations by Congress in any wholesale fashion by administrative allocation from Title II funds would be a very dangerous policy, with serious implications for our democratic form of government as well as for effective research work.

A *fourth* important principle that should be kept in mind in the establishment of policies and procedures for handling Title II funds used for research is that a significant portion of such funds should be used for contracts or grants such as are provided for or at least implied in section 205 of the act. This section provides that the Secretary of Agriculture shall have authority to enter into contracts and agreements under terms of regulations promulgated by him with states and agencies of states, private firms, institutions, and individuals, for the purpose of conducting research and service work, when in his judgement these can be performed or carried on more effectively, more rapidly, or at less cost than if performed by the Department of Agriculture. Such contracts may be made for work to be performed within a period of not more than four years from date of the contract, and there are no requirements for matching such funds.

The use of the contract or grant principle which has been effective in the case of many foundation grants would do much to encourage individualized research, and the development of research ideas and proposed projects from every possible source. Obviously all of the individuals who are competent or who should be encouraged to undertake research in the marketing of agricultural products are not now or will not be employed by the Department of Agriculture or the state experiment stations. Unless the grant principle is established as a definite policy in the administration of Title II funds, much of the possible effectiveness of the act will be lost. Personalized research has established itself over the years as a very effective means of efficient use of research funds, and this important aspect of agricultural research should not be

overlooked. Perhaps a research committee of seven, consisting of three representatives of the Research and Marketing Administration, one representative from the Office of Experiment Stations, one representative from the Agricultural Research Administration, one from the Bureau of Agricultural Economics, and one other individual might set up the procedures for administering this grant program. A strong educational program through the professional journals, over the radio, in pamphlets, and other means would help to call attention to the availability of funds and the possibility of grants for individuals or any groups or agencies that have worthwhile ideas for useful research projects.

The agricultural experiment stations have established a fine reputation in the field of agricultural research. Although there are certain types of problems upon which other research agencies or individuals can do more effective work, research on many agricultural problems, particularly those which concern a given area or product within a state or within a portion of the nation, will probably be done most effectively by the state experiment stations. Although Title II does not specifically designate any amounts of funds appropriated under this title for the state experiment stations and does not give any special preference to state experiment stations, nevertheless the state experiment stations will undoubtedly play a very important role in the carrying out of the objectives of Title II. Title II states that "maximum use shall be made of existing research facilities owned or controlled by the Federal Government or by state agricultural experiment stations. . . ." Also, Title II provides that "to the maximum extent practicable, marketing research work done hereunder in cooperation with the states shall be done in cooperation with the state agricultural experiment stations. . . ." It would seem apparent from the above wording of the act that Congress intended that experiment stations should share significantly in the use of Title II research funds. Some have suggested that Title II research funds might be divided into three equal parts, a third to federal agencies, a third for grants to individuals, private institutions or agencies, etc., and a third for state experiment station projects.

Regardless of the amounts which may be designated for experiment station projects, a well-thought-out procedure for handling such projects must be developed. Misunderstandings have arisen through the fact that projects submitted by experiment stations

have been referred by the RMA for technical advice or recommendations to federal agencies or groups not engaged primarily in research or whose major concern is other than research. The Research and Marketing Administration has the responsibility with the Secretary's approval to set up in consultation with the experiment stations a procedure which will be satisfactory to both groups and facilitate effective research by the experiment stations. Obviously, the Office of Experiment Stations can be helpful as a general liaison agency, but it is not the one to make the decision on allocations. Such procedure would change the whole function of the Office of Experiment Stations and its relations with the states. The Committee on Organization and Policy of the Experiment Stations is perhaps the group through which the RMA could work in trying to develop a handbook of procedure concerning Title II funds used for marketing research. A joint committee, comprising RMA staff members and members representing the experiment stations, with perhaps a total committee of five to seven members, should work out such a handbook.

A *fifth* principle which should be included in the establishment of policy in handling Title II research funds is that the matching provision with the state experiment stations, provided in section 204-b of the act, should be administered with flexibility. This matching provision is already proving embarrassing to some states, and with increased appropriations that will likely be made available in the years ahead for carrying out the provisions of Title II, this matching provision may be even more embarrassing in the very states or areas where marketing research is needed most or could be done most effectively. State experiment stations should, of course, try to secure appropriations for matching funds, and in many cases they probably will, but in the absence of matching funds the state or the institution should not be penalized. Each project should be considered on its own merits, and if the project is particularly meritorious, the absence of matching funds should not be a determining factor. Section 205 specifically implies that there should be flexibility in carrying out the matching principle by providing for contracts and agreements with the states with no matching requirements.

A *sixth* and final principle that should be kept in mind in allocating Title II funds is the very great importance of keeping the three phases of marketing work provided for in Title II (research,

education, and service) in proper balance. A careful study of Title II indicates that this was undoubtedly the intention of Congress. However, there has been no official announcement of such a policy. In fact, Department officials do not seem to be agreed on the types of work to be emphasized with Title II funds. The provision in Title III of the act to bring farm groups, trade groups, and industry representatives into a more intimate advisory relationship with the Department of Agriculture than in the past should not be confused as implying that major emphasis in Title II is to be upon marketing service work. The author can find no evidence in Title II of any congressional intentions to emphasize any one of the three phases of marketing work to the exclusion or reduction of the other.

Experience during the past century has clearly established the great contribution which research and education have made to our progress. This is not to minimize the importance of informational, inspection, regulatory, or similar marketing service work, but to dispel any notions that Title II funds were meant to be used principally for marketing service work. Research and education have significant roles to play, and if the funds allocated for research are not divided up into small, ineffective amounts on a shotgun basis but used to attack a few of the more significant marketing problems, research will prove once again that it is the foundation for an effective educational and service program.

Title III

Title III provides that in order to implement the marketing research, education, and service work authorized under Titles I and II and to assist in obtaining fullest cooperation among federal and state agencies, producers, farm organizations, and private industry in the development of and carrying out of such research, education, and service programs, the Secretary of Agriculture shall establish a national advisory committee of eleven members, six of whom shall be representatives of producers or their organizations. The Committee must meet at least once each quarter. This establishment of a federal advisory committee, designed to bring farm groups, trade groups, and industry representatives into a more intimate advisory relationship with agricultural research and service work of federal and state agencies, is highly desirable. However, the functions of the committee should be specifically advisory.

Title III also provides for establishing other appropriate com-

mittees, including representatives of producers, industry, government, and science. Nineteen commodity committees have been appointed, and this would seem to be far too many for effective operations. It is recommended that the number of commodity committees be reduced materially or eliminated entirely. If commodity committees are deemed desirable, they should be organized on rather broad commodity group lines, such as fruits and vegetables, dairy and poultry products, etc., rather than on the present very narrow basis. The trend should be definitely more in the direction of problem, or functional, committees such as foreign trade, transportation, cold storage, and the like.

Conclusion

There should be prepared as quickly as possible a simple handbook on procedure, covering Title II, together with a statement of policy regarding the relative emphasis to be placed upon the three phases of marketing work. This should be made available to all state and federal agencies undertaking marketing work and to all other interested individuals or agencies. The division of the Research and Marketing Administration staff into three sections—research, education, and service—to pass upon proposals and requests for funds for each of these types of work promptly and intelligently, once major policies are established and the handbook of procedure has been prepared, would improve federal-state relations and should improve administrative effectiveness.

The Research and Marketing Administration is the agency in the Department of Agriculture whose primary responsibility is not the conduct of agricultural research, but the encouragement and support of agricultural research through making funds available either through contracts, grants, or matching provisions. Also, the RMA has responsibility for encouraging and supporting educational and service work in marketing. The over-all objective is to develop a "sound, efficient system for distributing and marketing agricultural products which is so essential to a prosperous agriculture". All publicity released by the Research and Marketing Administration should give full credit to the agencies, individuals, or corporations performing the research, educational, or service work, and merely indicate that such work was done with the assistance of funds made available through the Research and Marketing Act. Obviously, to carry out properly its functions as an efficient financing

branch of the Department, the Research and Marketing Administration must be staffed with individuals who are familiar with and have attained some standing and proficiency in agricultural research and the marketing field, if they are to pass upon proposals and requests for funds promptly and wisely.

The problems encountered in developing more satisfactory federal-state relations in carrying out provisions of the Research and Marketing Act indicate decisively that there is a very real need for setting up more clearly established channels of information and understanding between the states and the Department of Agriculture, and for a more complete and continuous use of such channels. Major decisions of policy and procedure obviously, to be most effective, will be arrived at jointly by representatives of both the states and federal agencies. Above all, the decisions which are made should keep firmly in mind the achievements and promise of decentralized research on agricultural problems which has helped to bring American agriculture to a high level of efficiency and prosperity. In this program, the state experiment stations and extension services, and particularly the departments of agricultural economics, must play an important role.

DISCUSSION*

F. L. THOMSEN
Production and Marketing Administration

Dr. Renne evidently has given a great deal of thought to the many administrative problems involved in Federal-State relations under the Research and Marketing Act. For the sake of brevity I will confine my comments to those features of his excellent paper with which I am in disagreement.

I get the impression that Dr. Renne, despite his background in agricultural economics, believes too much emphasis has been placed on marketing work, both in the Act itself and in the administration of the Act. I know that many of the State college administrative officials with whom he has discussed the matter in recent months also feel, probably much more strongly than Dr. Renne, that this tendency to overemphasize marketing exists in connection with the Act. This feeling apparently is based partly upon the immediate difficulty of obtaining qualified marketing research, extension and service personnel, and partly upon a rather widespread lack of confidence in the potential efficacy of marketing research in helping to solve some of the more important agricultural problems.

* A discussion at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

I agree that it is not desirable to devote more funds to marketing than can be efficiently utilized over the long run. At the same time, I think that those who sincerely believe in the desirability of more rather than less emphasis on marketing should guard against the possibility of a permanent diversion of Research and Marketing Act funds to nonmarketing work, rationalized on the basis of the present temporary personnel shortage. Perhaps I am too suspicious of the intentions of some administrative officials in regard to support of marketing research. This may stem from my observations of what happened in the case of Purnell funds. Given a free hand, I am sure that many research and extension administrators could find what appears to them to be good use of most of the appropriations under the Act, in doing more of the same kind of things that have been done in the past.

We have heard here this afternoon several references to "overemphasis" of marketing. Personnally I fail to see any evidence of such overemphasis. Visiting the campus of an agricultural college, one is directed to the dairy building, or the soils building, or the chemistry building, but never to the marketing building. *The* marketing man on the staff may be found sharing a room on the third floor of the administration building!

Dr. Renne says that "even agricultural economists are inclined to admit that this is placing heavy emphasis upon marketing and new and extended uses." Again, he hopes that opportunities for other contributions under the Act will "not be lost because of undue emphasis or preoccupation with a single phase of the agricultural problem. . . . " He raises the question as to whether "the Act perhaps does not give sufficient emphasis to research on the broad fundamental problems. . . . " He apparently does not like the fact that "the emphasis is preponderantly on marketing work, and implies that an increase in marketing efficiency . . . will largely solve Agriculture's most pressing problems."

Dr. Renne points out that "all of us know that more efficient marketing will not in itself make the difference between 4-cent hogs and 30-cent hogs. or between 35-cent and $2.00 wheat, or between 5-cent and 20-cent cotton. These prices have occurred under marketing procedures that were essentially identical."

The implication is that because changes in business conditions or international trade have had more effect on livestock or crop prices than have marketing changes, marketing research will be correspondingly less effective than research in other fields including business conditions or international trade. I am sure that Dr. Renne, on second thought, would draw no such conclusion. Remedies are not necessarily related to causes. A broken leg is treated in the same way whether incurred in an automobile accident or from a slip in the bath tub. And fluctuations should not be confused with levels. Marketing conditions in the past have not fluctuated as much as some other conditions, but this does not imply that we may not contribute as much or more to raising the level of agricultural income through improvements in marketing as by improvements in other conditions which might be the subject of research and service work under the Act.

I am not one of those who look upon marketing as "*the* agricultural prob-

lem," but I am vigorously opposed to the defeatest attitude which many of our research administrators and even agricultural economists seem to have toward the practical benefits to be derived from marketing research and service work. I believe that any evidence which may appear to support such an attitude reflects the inadequacy of our approach to marketing research and service work.

In my opinion, if we disagree with Congress in its evident intention to place major emphasis on marketing in the work under the Act, and believe that the appropriations should have been authorized for use in developing other types of research, we should take these conclusions to Congress and suggest a revision of the Act. Meanwhile, right or wrong, Congress has directed us to emphasize marketing, and we should make an honest attempt to use the funds for finding major solutions to major marketing problems, rather than to circumvent the intention of Congress by indirection.

Although he has been very diplomatic about it, Dr. Renne has seemed to favor a division of funds which would give the State institutions a more nearly fixed and greater share of them, and fewer restrictions on the way in which college officials might spend these funds. I gathered that he does not fully approve of the degree of flexibility in the administration of the Act which has been given by Congress under Title II. He wants the Administrator of the Research and Marketing Act to issue a policy statement fixing these conditions to a degree which the Congress itself avoided.

Without trying to justify the manner in which the Administrator's staff has handled the job of administering Title II funds under the flexible provisions of the Act, I maintain that we would be reducing potential accomplishments under the Act by eliminating or materially reducing the flexibility under Title II by allocations of funds on a cut and dried basis. We need more rather than less centralized direction of research under the Act, and more rather than less cooperation between Federal and State agencies.

Most important marketing problems are not found within the boundaries of a farm, a local shipping point, a State, or even a region. Marketing research and service work presents a different problem, requiring a quite different approach, from research and extension in agricultural production. The failure to recognize this, and the continued attempts to do marketing work on the same kind of individualized, lone-wolf basis that frequently has characterized production research, is in my opinion a basic reason for the lack of larger accomplishments in the marketing field in past years.

The atomic bomb never could have been consummated successfully by individualized laboratory research, even though much of the latter was a necessary prerequisite. Similarly, the marketing job is big and complex, and its successful conclusion will necessitate large scale thinking and team work. We will never get very far as long as both State and Federal agencies give more attention to jealously guarding their bureaucratic positions than to clearly outlining and attacking the national marketing problems which the Congress directed us to deal with under the Act.

Dr. Renne apparently labors under the erroneous impression that Title II funds going to the Production and Marketing Administration are used mainly for marketing service work. He has used some very diplomatic language in conveying the thought that many State research administrators frown upon substantial allocations of Title II research funds to PMA, and are not eagerly seeking new research relationships with that agency of the Department. The ostensible reason for his attitude seems to be the fact that PMA is engaged primarily in marketing regulatory and service work. Surely, however, this responsibility for regulatory and service work cannot be seriously considered as the true basis for such objections to research by PMA. The Agricultural Research Administration has very extensive responsibilities in the regulatory and service field. A large part of the activity of the Bureau of Agricultural Economics consists of service work closely allied to that done by PMA. The State institutions themselves are engaged in a variety of service and regulatory activities. It is my impression that some people are allowing themselves to be influenced, in their attitudes toward marketing research agencies, by considerations which have nothing to do with marketing research. I am in no sense defending the present organization of marketing research within the Department, but do maintain that in any consideration of the matter we should be governed by needs and potential accomplishments under the Act, not by extraneous considerations.

Dr. Renne suggests elimination or radical reorganization of the industry advisory committees. I also have found many things to disagree with in the advisory committee set-up. At the same time, it would seem that there are certain benefits to be derived from the committees which have been overlooked by Dr. Renne. They are an important factor in public relations, in fostering support for the marketing research program, and in unearthing problems requiring attention. Later, it is to be hoped that they will constitute an important means of getting the end products of the research program into actual application, without which the research itself would be of little value. No doubt some simplification and revision of the advisory committee system is desirable, and I believe that the matter is receiving attention from the Administrator.

DISCUSSION*

H. R. WELLMAN
University of California

It is worth while for research workers to have the opportunity from time to time to view the problems of research through the eyes of the administrators. Such a view might make us somewhat more tolerant of administrators, and possibly enable us to offer some constructive suggestions to administrators.

* A discussion given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

Dr. Trelogan has mentioned the more important problems with which he and his colleagues have had to wrestle in launching the ambitious and somewhat novel program of research in marketing under the Research and Marketing Act. He has indicated how they have attempted to meet these problems, and has given us some idea of the degree of success achieved. He readily admits that numerous mistakes have been made, but claims that these "appear to have been outweighed by the gains made in getting productive work started with widespread participation along the courses intended by the legislation." He also points out that "numerous problems have been only partially solved or remain for further attention."

"At the moment . . . the one problem about which all others tend to center," says Dr. Trelogan, "is the fact that the demands for work are far greater than can be financed or adequately staffed." He places considerable stress upon lack of funds. The failure of appropriations to match authorizations has no doubt complicated the administrator's task. Choice among alternatives is seldom easy, and denial of requests is not a good way "to win friends." Nevertheless I am inclined to place less emphasis than Dr. Trelogan does upon lack of funds, and to give somewhat more weight to shortage of qualified personnel.

The supply curve for well-trained research workers is relatively inelastic in the short run. More funds would have increased the demand for research workers in marketing but would not have added much to the current supply of them. The market price for their services might have been pushed up, but not much more research would have been accomplished.

The dangers of having more money to spend on marketing research than there are qualified persons to employ are of two sorts. First, there is the temptation to hire people who are not yet adequately trained; and second, there is the temptation to shift personnel from other fields to marketing. Resort to these expedients would tend to lower the quality of research in marketing, and in the long run would probably do more harm than good.

One of the novel features of the Research and Marketing Act is the wide latitude given to the administrator in the allotment of funds. It is this feature which gives rise to most of the administrative "headaches." Dr. Trelogan points out in making allotments "a reasonable balance between commodities, between natural and social sciences, and other classifications must be maintained." But just what is "a reasonable balance" he very wisely does not say.

Whether administrative allocation of funds will prove to be superior to congressional allocation of funds either by direct appropriation or by formula remains uncertain. Only time will tell. Ten years from now we may have acquired sufficient experience to warrant drawing conclusions, but not now.

Likewise I doubt that sound judgments can yet be made regarding the effectiveness of regional research. If we had to strike a balance sheet today, I suspect that the results secured per dollar of expenditure would not be impressive. Yet regional research has, I think, considerable potentialities. But whether these potentialities can be realized is by no means certain.

While the provision for regional research was designed to reduce duplication of work among states, another provision of the Act is likely to increase duplication of work within the states. Allocation of funds to state departments of agriculture or state bureaus of markets will, I suspect, lead to some overlapping of work done by the experiment stations and extension services. How serious such duplication may become, I have no means of knowing. But it does pose a real problem which could become acute.

And finally may I emphasize the point which Dr. Trelogan made in his closing paragraph. Much hard work remains to be done by all of us before the Research and Marketing Act becomes securely established. It is still on trial.

ROUNDTABLE ON WORLD TRADE

Chairman: Bushrod W. Allin, Bureau of Agricultural Economics

UNITED STATES FOREIGN TRADE POLICY— A PRACTICAL APPROACH*

JOHN W. EVANS
Department of Commerce

MY PRINCIPAL purpose in this paper will be to help you feel something of the impact of the prejudices and aspirations of other countries on our own policy determinations.

I believe it is the failure of the businessman, and often of the economist, to appreciate these practical obstacles that has lead to such a wide acceptance of the charge that the United States has no economic foreign policy. If we believe in free enterprise, why do we permit purchasing missions of foreign governments to take business from American private exporters? If we are opposed to the use of quantitative restrictions on trade—of quotas and embargoes—why do we tolerate the barriers that almost all countries have erected today to limit the importation of goods from the dollar areas of the world? If we believe in non-discrimination in trade, why do we admit to our shores the goods of countries that discriminate against our exports?

The impossibility of formulating our own national policies in a vacuum—without regard to world opinion, was revealed in the series of international negotiations that culminated in the Havana Charter for the International Trade Organization, adopted in March of this year by 53 nations, subject to ratification by their congresses and parliaments. The United States provided the initiative for these conferences and prepared the draft upon which all the discussions were based. As might have been expected, the basis of that draft was the traditional American pattern of liberal and non-discriminatory commercial policy, but even in the first draft an effort was made by the United States to inject a note of realism. In spite of the strong hold that private enterprise has on American thinking, there was no effort in the draft to outlaw state trading. The American drafters were content to provide rules which would

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prevent nations from nullifying, through state trading operations, their basic undertaking to refrain from coercing trade into unnatural and uneconomic channels. Although the drafters transferred to this international arena the traditional American fight against monopolies and cartels, they recognized the necessity for an exception to their own principles and provided for price stabilization agreements among governments. Although they gave powerful expression to the American conviction that quantitative restrictions on trade are more destructive than tariffs, they made provision, at least during the postwar period, for the problems of countries which must ration the use of their scarce supplies of hard currencies.

But the note of realism in the American draft of the Charter was not sufficient to meet the objections of those countries which opposed the American concept of liberal international commercial policy. At Havana the forces of opposition on more than one occasion came close to winning control of the Conference and to writing not a Charter for freer world trade but an international endorsement of permanent and chronic economic warfare.

The source of what is probably the most insistent opposition to the American drive toward a reduction of world trade barriers is the urge for economic development in almost every economically backward country of the world. On the surface, this ambition is understandable enough. If it could be achieved it would mean greater prosperity and higher living standards throughout the world. But what most so-called "backward countries" mean by *economic* development is *industrial* development. And when a country of a few million inhabitants tries to rival the great industrial centers of the United States or Western Europe, its costs are likely to be too high to permit it to compete with the goods of older industrial areas. It must not only reserve its own market for domestic exploitation but must try, through bilateral trading deals or through the creation of preferential trading areas, to obtain a larger protected market for the forced growth of its new industries than its own population can provide. In doing so, it is likely to condemn its people to a lower standard of living even than that which they have enjoyed under a colonial or quasicolonial economy. Yet, the drive to industrialize is insistent throughout the world. The depression of the 1930's taught most raw material producing countries that in the declining phase of the business cycle the goods they sell in world markets fall much more rapidly than the goods they buy. The sec-

ond world war taught them that they cannot depend on foreign sources for even the minimum necessities of modern life. But the impetus to industrialize derives as much from political as economic motives. As colonial areas have gained their political independence they have quite naturally sought to confirm their new status by some practical demonstration of economic independence.

The drive toward industrialization begets an immediate hostility toward any proposals for liberalizing world trade. At Havana it provided the unifying force behind an undeveloped country bloc that opposed almost all proposals for restricting the right of member countries to use import quotas or embargoes or to create new preferential systems. And the almost religious fervor that moved the countries making up this bloc enabled them at the same time to outdo the United States in their insistence that existing preferential systems and the use of quantitative trade barriers by the industrialized countries be abolished.

Let me give you an example of the lengths to which the passion for industrialization carried its disciples. The draft Charter, presented to the Havana Conference by the Preparatory Committee, contained a general prohibition against the establishment of any new tariff preferences, though it permitted the organization to grant exceptions, in unusual cases, where such a preference could be justified as essential to an approved program of economic development. At the beginning of the Havana Conference more or less sweeping amendments to this provision were submitted by self-styled undeveloped countries from all over the world. Three Central American countries submitted amendments which would permit any new preferential system between any two or more countries of that region. Other amendments would have permitted any new preferences desired among the countries that formerly made up the Republic of Greater Colombia, that is: Venezuela, Colombia, Panama and Ecuador. One of these, an amendment submitted by Ecuador, would also have permitted any new preference between Ecuador and any contiguous country, or between any two contiguous countries in Latin America or between any pair of Latin American countries regardless of location. An amendment submitted by Argentina would have permitted any preferential arrangement between any two contiguous countries, provided one of them was "undeveloped." Several amendments were submitted permitting new preferences among the members of the Arab League or between

members of the former Ottoman Empire. Another amendment, subscribed to by several countries, would have permitted new preferences among the countries of a swollen Middle East, ranging from Greece on the west to Afghanistan on the east. And, finally, an amendment by Burma would have permitted new preferences among any of the countries of South East Asia.

The amendments to which I have just referred had to do with a single article of the Charter. There were amendments as drastic in content and nearly as numerous affecting nearly every substantive article which could in any way have restricted the freedom of action of undeveloped countries to encourage the forced growth of a Birmingham or a Pittsburgh in every desert and on every tropical mountain slope. Special exemptions were demanded from the requirements relating to use of import quotas, the use of protective internal taxes, of price fixing or of state trading, or relating to the negotiation of tariff reductions.

While the desire to industrialize may be the most conspicuous of the forces in opposition to a liberal trade policy, there are many others. But most of them spring from a common emotion; fear of uncertainty. This fear, not limited to undeveloped countries, takes a great variety of forms. There is the fear on the part of raw material producing countries of price demoralization in the event of another world depression. At Havana this fear gave rise to demands that the United States guarantee to the rest of the world that it would not repeat its breadlines of the 1930's. However unrealistic these demands may sound, it would be a mistake to ignore the fact, only too apparent to the rest of the world, that the prosperity of all countries depends on the prosperity and the purchasing power of the United States.

The European countries demanded greater freedom to control their imports, as a necessary aid to reconstruction, than had been provided in the original American draft of the Charter. They cited not only their present shortage of dollars and the necessity for conserving those dollars for the purchase of food and essential capital goods, but also the longer term competitive disadvantages arising from the destruction of their capital plant, the loss of skilled manpower in the war, the liquidation or destruction of income-bearing foreign investments, the growing disadvantage in their terms of trade arising from increasing world agricultural prices and, in general, the dislocation of their economic institutions.

One of the most puzzling manifestations of this sort of fear at Havana was the attitude of the United Kingdom. To an American economist it would seem that the recovery of Britain as a world power is dependent upon a maximum volume of world trade and that a simple will to survive would prompt her to grasp at any opportunity that offered a chance of reducing trade barriers in other countries. But both in the trade agreement negotiations at Geneva and during the Havana Conference it often appeared that the British were willing to sacrifice his one chance rather than give up any of the obviously temporary advantages of the Empire preferential system.

In the field of international investment a basic conflict of objectives within the unindustrialized countries resulted in another source of resistance. Although industrial development would obviously be promoted by the encouragement of foreign investments within their borders, many of these countries strongly resisted any proposals to restrain their freedom of action to discriminate against foreign investments or to confiscate the property of foreign investors. This apparent paradox arises from the fear, sometimes justified by experience, that large foreign commercial or industrial interests exercise an undue influence in the political life of the country in which the investment is located. Attacks on Yankee imperialism make good copy in Latin America and have paid off well in many a political campaign. And no Latin statesman who consults the sub-Rio Grande version of the Gallup Poll would openly advocate the encouragement of foreign investment by the one device most likely to succeed—non-interference. A number of Latin American delegations attempted to solve this problem by proposing that the large, industrialized countries accept an obligation to make public funds available to their more backward brothers.

Those are some of the trials that must be faced by any American economic foreign policy. I have described them not with any pretense that they encompass the entire problem or even that they provide a particularly useful guide. Let us call them a series of random and disorganized laboratory observations.

Any actual analysis of the problem must begin with an assumption as to the objectives we intend to pursue. Here, fortunately, we are on fairly solid ground. I think we can accept as axiomatic that the objective of foreign policy—both political and economic—

is security. The only differences of opinion lie in how we translate "security." To many it will be synonymous with peace, and to these, peace itself will appear to be the ultimate objective. But the security objective of every administration in our history has encompassed two aims: peace if possible, but strength in the event of war. Thus, while promoting and supporting a United Nations to prevent war we actively prepare for the next war, though we hope it will not come. There have often been wide differences of view as to which of these twin aims should predominate at any point in time. But complete reliance on one alone has been limited to a handful of extremists in either camp.

The first dilemma of our economic foreign policy, then, lies in this dualism. Economic policies aimed at promoting and preserving peace may sometimes weaken our own strength in the event of war, and economic policies or programs aimed either at a direct addition to our wartime strength or at supporting the political objective of strengthening our potential allies will frequently run counter to those policies best designed to avoid international friction leading to war.

While this dilemma is real enough when we must choose between certain alternative economic measures, there is a general course of policy that can, at least theoretically, promote both objectives at the same time. And it happens that this is the course that has been followed throughout our history—a course that is entirely consistent with the basic philosophy that has characterized American economic life from the beginning. In internal affairs it is seen in the constitutional provision against trade barriers between the states and in our anti-trust laws. On the international front it is seen in the constitutional prohibition against export taxes, in our adherence to a single column tariff, in our traditional friendliness toward the investment of foreign capital withon our borders and, at least during the twentieth century, in the adherence of both political parties to the principle of unconditional most favored nation treatment for all countries. This basic policy may be briefly summed up as the promotion of freedom of initiative in trade and investment, with a minimum of artificial restraint.

This liberal tradition has served the country well. And because it is deeply rooted in American thinking, any discussion of what our policy should be must begin with it as a starting point. Will it serve as a foundation upon which a more detailed structure of

economic strategy for the future can be built, or has it outworn its usefulness?

Any foreign policy, to survive, must meet three tests. It must be designed to achieve an objective that corresponds with the real interests of the citizens it is intended to serve. It must be understandable to those citizens and consistent with their established traditions. And it must have a reasonable chance of acceptance by the outside world if it depends on the cooperation of other countries for its success.

The liberal policy meets the first of these two tests surprisingly well. It does seem to offer a means of reconciling the apparently conflicting sides of our basic security objective. It fits our need for national economic strength even better than when it guided the founding fathers. If a large volume of trade contributed to the growth and prosperity of the United States in the nineteenth century, it has become essential to us in the twentieth. We have emerged from two world wars as the world's only great creditor nation. At the same time, the vast natural resources upon which our growth was largely based, have suffered serious depletion. Furthermore, the rate at which we can exploit those resources has been overtaken and exceeded by the tremendous growth in our plant for processing materials into goods for consumption or for defense. While trade barriers in general reduce the volume of trade, discriminatory trade barriers can lead to the total destruction of most trade in the long run. The essence of trade is specialization. And the bilateral balancing of trade—frequently the motive and always the effect of discrimination—drastically limits the field of specialization. The policy of non-discriminatory, multilateral, trade, with a general lowering of tariffs, provides a practical compass direction for achieving the objective of American economic strength.

The same policy should be equally well adapted to the aim of promoting peace. It is no longer possible to attribute all wars to economic motives, but it is safe for us to accept the view that economic rivalries do provide powerful incentives for dispute. If all trade barriers around the world were removed, there would be no need to fight wars to obtain access to markets or raw materials. And even if the world were only to abandon the discriminatory use of barriers to trade and investment there would be fewer opportunities for international political friction. If unrestrained trade has added to the prosperity of each of the American states, it should

contribute to the prosperity of nations. And if we accept the thesis that more prosperous neighbors are more friendly neighbors, a liberal trade policy should increase our chances of avoiding wars in the future.

I believe I have already demonstrated that a policy based upon non-discrimination and upon opposition to quantitative restrictions on trade is consistent with some of the most firmly rooted of American traditions. I will spare you a further elaboration of the point that it is the *only* policy that is consistent with our belief in private enterprise. Up to this point it seems safe to say that the liberal foreign trade policy meets the second test—that of acceptability to the American people. The only source of doubt is the question of public attitude toward a policy of reducing tariff levels in international negotiation. The Reciprocal Trade Agreements Act has a much shorter history than the other elements that make up the broader policy we have been discussing. But even here the evidence is of overwhelming public support. Shortly before the expiration of the Act this year, for example, a Gallup Poll showed 83% of informed voters favoring extension.

There remains the third test of policy. Has it sufficient foreign acceptance to hold out a reasonable chance of success? From the analysis at the beginning of this paper, it may seem to you that the United States stands at one pole, with all the rest of the world at the other, and that nothing but the blindest optimism could justify our continuing to pursue a course of liberal trade. Let me sum up the brighter side of the picture.

In the first place, very little that happened at Havana indicated any great philosophical gulf between the United States and the other countries at the Conference. With very few exceptions the delegations present indicated their fundamental belief in the maintenance of free enterprise and of the conduct of trade on the basis of freedom of choice. The amendments they proposed usually took the form of specific exceptions to meet their real or fancied problems rather than a denial of the basic philosophy behind the original American proposals. In fact, other countries sometimes stood on the side of simon-pure liberalism against the United States, as when they attacked, with some unanimity, the provisions which would permit the United States to continue its agricultural subsidies. On the other hand, some of the exceptions to pure liberalism, proposed by other countries, turned out upon examination to be in

the interests of the United States. For example, some relaxation of the restrictions governing the use of customs unions appeared essential if the purposes of the Marshall Plan in strengthening Western Europe were to be fully realized. Most important of all, the opposition to the United States proposals was never unanimous on any point. When the devastated countries strove to open a breach in the basic principles, they found themselves opposed by the small countries, and when wide open exceptions were proposed for the benefit of the undeveloped countries, Canada, the European countries, and frequently the southern British Dominions rallied to the defense of liberalism.

But the final proof that the United States is not out of step with the rest of the world lies in the document that was finally approved by the representatives of 53 countries at Havana. This Charter made concessions, it is true. Some exceptions were broadened. An entire chapter relating to economic development took the place of a few brief articles in the original American draft. But in spite of these changes the basic principles remain almost intact.

The undertaking to lower trade barriers is still there in the obligation imposed on all members to negotiate with each other for the reduction of tariffs and for the elimination of other charges imposed on imports. The basic rule against discrimination remains, and the only permissible exceptions are those which derive either from demonstrated balance of payment difficulties or from a demonstrated need in connection with an approved program of economic development. The rules which govern state trading operations are more complete and stronger than those in the original American draft. The obligations of governments with respect to restrictive business practices—while not quite so rigid as in our first proposals—go far beyond any previous agreement in the internationalization of our anti-trust policies. Intergovernmental cartels, in the form of commodity agreements, are placed under the control and supervision of an international organization for the first time in history.

The conscientious student of the Charter for the International Trade Organization will find many points at which he disagrees with the final text. Some of the exceptions to the rules will be deemed unnecessary. But he must inevitably conclude that the Charter does provide for the first time a mechanism whereby international economic disputes may be ironed out, and that the Charter represents the first effort to provide any international restraints on many

of the practices of governments which have been most disastrous to maximum trade and to peaceful political relations.

The contents of the Charter for the ITO are likely to be discussed a good deal during the next six months, as it must be submitted to Congress for ratification. Every economist will want to study its provisions and reach his own conclusion as to whether, taken as a whole, it forms a reasonable basis for the conduct of our international economic relations. You will want to compare its rules, including the exceptions to those rules, with what we would have in the absence of its adoption. Some of the obligations it would create among its members approximate or duplicate obligations now existing in bilateral agreements or treaties with some countries. Many others represent a first try at international convention and international cooperation in fields which have hitherto been left entirely to the determination of each country. While I do not want to reach your conclusions for you, I do urge that you compare the Charter not with an imaginary ideal but rather with the existing body of international rules and obligations. Those of you who have the time and patience will also find it worth while to study the text of the Charter drawn up at Havana with the 600 or more amendments which were submitted at the beginning of that Conference.

As of possible help to you in your study of the Charter, I want to point out one more feature of its provisions—what might be termed its automatic safety valve. I have heard claims that the basic principles of the Charter have been destroyed by the exceptions and escapes which it contains. Put still more harshly, the claim has been made that the Charter is honeycombed with exceptions which are available to every country except the United States. Now, there are basically only two major types of exceptions to such fundamental principles as that of non-discrimination and the prohibition against quantitative restrictions. One of these has to do with the need for economic development of backward countries. The exceptions of this type are in every case permitted only under the close supervision of the International Trade Organization and, usually, only with the prior approval of the Organization or based upon a finding of fact by the Organization. Unless a majority of the members of the Organization should be completely cynical, this safeguard should prevent these exceptions from becoming a rule. The other class of exceptions are those permitted to countries in balance of payments difficulties. In this case the right to use the exception

must be based upon findings by the International Monetary Fund. But let us suppose that all the other countries of the world are able to establish the fact that their reserves of gold or hard currencies are dangerously low and thereby be entitled to recourse to these exceptions. That would come fairly close to being the situation today if the Charter had now been ratified by the requisite number of countries and the Organization had come into existence. Under these circumstances it is true that many of the advantages which should accrue to our export trade under the terms of the Charter and under the tariff concessions that we received in the related General Agreement on Tariffs and Trade could be nullified while the exports of the other member countries to the United States would enjoy the full benefits of the Charter with very few exceptions.

On the face of it this may appear inequitable. But every economist knows that the limitation on our total exports today lies in the world's ability to earn or borrow dollars and not upon the restrictions imposed by any one country. The crying need at this time is for an increase in our imports. For our exports as a whole no present stimulation is needed, though there are many individual instances in which we will want to oppose discrimination against American goods in order to preserve our markets for the future. Some day the present imbalance will be corrected. Our exports to the world will have fallen or our imports will have increased to the point where it is economically desirable for us to obtain a lowering of world barriers to our exports in general. At that time most countries will have escaped from their balance of payments difficulties, and, under the terms of the Charter, they will no longer be entitled to these exceptions, and our exports will begin to receive the full benefit of the Charter provisions and of the tariff concessions which we have negotiated. Thus, the exceptions in the Charter will, if properly drawn, operate to restore and maintain an over-all balance of trade and payments throughout the world.

So far, my analysis seems to be approaching the conclusion that the most realistic economic foreign policy for us to adopt is the one that is now being followed by the United States Government, and that the most concrete exposition of that policy is to be found in the ITO Charter. That is, frankly, what I believe. But the analysis omits certain important phases of our economic policy that must be considered. It does not necessarily take into account the fact

that economic policy must serve the political policy being pursued at any given time. Obviously the most important phase of our international political policy at the moment is the effort to strengthen and restore the countries of Western Europe and the territory of the former enemy states now occupied by us or our Western allies. The strengthening of Western Europe requires not only financial aid but also sympathetic assistance to the efforts of these countries to get back on their own feet. Many of our judgments must be qualified by this shorter term but pressing necessity. Our attitude toward the establishment of customs unions must be modified so as to encourage the closest possible cooperation among the countries of Western Europe. We cannot permit our attitude toward the use of quantitative restrictions to prevent such bilateral trading agreements among those countries as may create beneficial trade that would not take place in the absence of such agreements. Coming closer to home, we must balance the need for maintaining and military strength against the objective of strengthening Europe and other friendly countries. This last point will launch me on my only excursion into the unpopular subject of export controls. If it were possible to view our future security entirely in terms of the strength of the United States within its continental limits, it would make sense for us to prohibit the exportation of all those capital items that would serve any purpose in building our industrial capacity. But if we want strong allies the export of a few thousand tons of steel, of machine tools or even of food may add much more to our global strength than if they were consumed in the United States.

I have named only some examples of the special problems that arise if our economic policy is to be coordinated with our political policy. But I hope they are enough to show that a too academic approach to our basic policy of liberalism in world trade and our basic purpose of maintaining maximum strength within our own borders must be qualified. With this in mind, I think you will find that many of the provisions in the ITO Charter are more realistic, from the point of view of the United States, than they may appear at first glance. And I hope you will find that the administration of our export controls, though such controls by their very nature involve injustices and inconsistencies, at least indicates an effort at realism.

I am afraid that all that I have said will sound like an apologia

for the entire present course of United States policy. It has not been so intended. Many mistakes have undoubtedly been made. I know of some and have played my share in making those mistakes. My main thesis is that, in spite of the calamity howlers, the world has not so changed as to make our old gods impotent. So long as we approach them with a touch of realism they should still serve us well. I have tried hard to conjure up better or more practical ones but have not been able to find them.

DISCUSSION

DON S. ANDERSON
Production and Marketing Administration

Recently the paper reported that the Secretary of Commerce had secured a twelve per cent reduction in the allocation of wheat for export that had been recommended by the Secretary of Agriculture. These same papers implied that this was a victory for the Secretary of Commerce over the Secretary of Agriculture. Perhaps this should anger me and cause me to find much fault with Mr. Evans' paper, since he is a part of the Department of Commerce.

But I find it hard to be angry. Old things are comforting, and last evening it was pleasant to encounter old things—it was comforting to find that agricultural economists—at least some of those on last evening's program —were still concerned with an old worry of theirs—agricultural pressure groups. This afternoon we have another old friend—foreign trade—and in the main those agricultural economists—who through the years have argued that much of our agricultural production must be gotten rid of in foreign lands if we are to be prosperous should find little to disturb them in Mr. Evans' paper. For Mr. Evans makes reference to a similar circumstance when he says "there are many individual instances in which we will want to oppose discrimination against American goods in order to preserve our markets for the future." Certainly the phrase "to preserve our markets for the future" suggests that some one feels that some time it will be necessary to get rid of some of our production in foreign lands if we are to be well off.

Now this, of course, has nothing to do with pressure groups or with the twelve percent reduction in the wheat export allocation. This reduction will make more wheat available for the United States housewife. The fact that with a fixed amount of money available to ECA the less money spent on agricultural products the more will be available for industrial products is entirely incidental. Last evening's discussion seemed to indicate that all of the pressure groups are on the side of increasing exports of farm products.

But there are one or two sentences in Mr. Evans' paper that do raise the question of pressure groups—to which reference was made last evening. It reads, "While the desire to industrialize may be the most conspicuous of the forces in opposition to a liberal trade policy, there are many

others." Reference is made to "the desire" but we are given no hint of who has or holds this "desire." If the "desire" exists in a democracy, who could hold it and make it felt other than a group? But perhaps it would be a pressure group only if the "desire" was one of which we did not approve. If on the other hand the "desire" was one held to be worthy, the group would just be nice people interested in the "general welfare."

There is another sentence even more suggestive of group action. It reads, "This apparent paradox arises from the fear, sometimes justified by experience, that large foreign commercial or industrial interests exercise an undue influence in the political life of the country in which the investment is located." Obviously the topic assigned to Mr. Evans did not require that he comment on the possibility of large commercial or industrial interests exercising undue influence when they are located not in foreign lands but in the land of the owner of the investment.

But there are other parts of the paper that could have been elaborated on to the benefit of those who are here to hear it. It is stated that "we can accept as axiomatic that the objective of foreign policy—both political and economic—is security." It is stated further that "the security of every administration in our history has encompassed two aims: peace if possible, but strength in the event of war." With this most people will probably agree, for most of us want peace so badly that we are willing to go to war if that is necessary to preserve the peace.

The bothersome sentence in the discussion of this conflict between what is necessary to preserve the peace and what is necessary for strength in war reads, "Economic policies aimed at promoting and preserving peace may sometimes weaken our own strength in event of war."

Why should this be so? For example, it is pointed out that, "the vast natural resources upon which our growth was largely based, have suffered serious depletion." Our strength in war should then be strengthened by large imports of materials free from import duties. Should such imports interfere with the keeping of the peace? Do we now have restrictions of our own that interfere with such importations? It has been reported that surplus property abroad has not easily been brought back to this country.

"The basic policy of the country is briefly summed up as the promotion of freedom of initiative in trade and investment, with a minimum of artificial restraint and it is suggested that this policy is well adapted to the aim of promoting peace."

Why should there be any thought of conflict in the field of foreign trade between keeping the peace and strength in event of war? Might it possibly be that this is a carryover from the idea of so many agricultural economists that we must get rid of much of farm production in foreign lands if the farmer is to be prosperous, or of the industrialist that he must have foreign markets if his profit and loss statement is to be pleasing to his stockholders? Have economists unconsciously accepted the Marxist criticism of the capitalism that capitalism cannot survive without foreign markets in which to dump a part of its output?

We say we must export in order to import! But what is it that we need from foreign lands that they would not sell us if we gave them a chance?

We are told "that every economist knows that the limitation on our total exports today lies in the world's ability to earn or borrow dollars and not upon the restrictions imposed by any one country." If this be so, and there is no reason to doubt it, why do we persist in our emphasis on foreign markets for our foods rather than on American markets for foreign goods?

Last evening Mr. Elmhirst suggested that man was something other than a "consuming animal." For that suggestion we might find the answer to the economist emphasis on "selling" rather than on "buying" when he talks of foreign trade.

THE EUROPEAN RECOVERY PROGRAM AND THE AMERICAN FARMER*

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THE American farmer has good reason to be interested in the European Recovery Program—primarily in the longer-run effects of the Program on European production and trade. He wants to know how much recovery and change in Europe's agriculture can be expected by the time the Program is ended. And he is anxious to have the Program contribute heavily to the development of European export industries that can finance continued large agricultural imports.

In this paper special emphasis will be placed on assessing the the past and prospective recovery and redirection of European agriculture. Secondary attention will be given to the import needs of the ERP countries and to the related benefits and adjustment problems that American farmers can expect to result from the Recovery Program.

Three Years of Agricultural Recovery

How much agricultural recovery has already occurred in Europe? This is not an easy question to answer. Many of the postwar crop and livestock estimates of European governments are almost certainly too low; and there is no basis for determining the *degree* of underestimation involved. The FAO consistently publishes the official estimates, whereas the Office of Foreign Agricultural Relations often publishes higher unofficial approximations.

Despite quantitative uncertainties, several facts about the postwar agricultural recovery of Europe are fairly well established. First the low point in farm output was reached in the crop year 1945–46, when the total production valued at prewar prices apparently amounted to only 65–75 percent of the average for the last five prewar years.[1] This low level was due in part to shortages of trained

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

[1] An FAO study, based on official figures, estimates the agricultural output of 1945–46 in 23 European countries at 63 percent of the level in 1935–38 (United Nations, Department of Economic Affairs, *A Survey of the Economic Situation and Prospects of Europe*, April 1948, pp. 10–12). In contrast, the OFAR, using adjusted figures, estimates the 1945–46 "total farm output" of Continental Europe ex USSR at about 75 percent of the prewar average (*World Food Situation 1946*, February 1946, p. 43). The presnt writer believes that this wide range of estimation cannot be narrowed appreciably on the basis of evidence now available.

farm workers, draft power, farm equipment, fertilizers, and good seed, to agrarian reforms and population shifts in Eastern Europe, and to substantial destruction of crops and livestock through military operations. Important as these war-associated factors were however, they deserve little more emphasis than the prolonged, drought of 1945, which took heavy toll of crops and pastures throughout the Mediterranean and Danubian areas.

In the following year, European farm production rose to something like 73–83 percent of the prewar level. Weather conditions were generally favorable except in southeastern Europe, where drought again sharply reduced the Danubian harvests. In other areas, crop increases were limited mainly by disorganized transport and by persistence of many of the shortages of the preceding year.

Considerable progress was made during 1946 in returning workers to their farms and in providing farmers increased supplies of production equipment and fertilizers.[2] In the fall of 1946 European farmers reasonably hoped to expand their sowings of better seed on better-prepared and better-fertilized land. But atrocious weather defeated them. In western Europe winter set in before the planned sowings were completed. Later, record-low temperatures heavily damaged the planted crops. Finally, the summer of 1947 brought one of the worst droughts in history to central and western Europe. In consequence the production figures for 1947–48 were lower than those of the preceding year.

In view of these circumstances, one must look to the 1948 output figures for the first reliable indication of the degree of agricultural recovery in Europe. The preliminary crop figures now available suggest a European bread-grain harvest equal to 85–90+ percent of the prewar average and a total grain-potato-sugar outturn of similar proportions. Since the production of animal products will be relatively smaller, we can now expect the total agricultural output of Europe to be larger in 1948–49 than in any preceding postwar year, but still some 15 percent or more below the prewar level. This implies a rate of recovery in agriculture lower than in other sectors of Europe's economy.

[2] U. S. State Dept., Pub. 3093, *Commodity Reports including Manpower* (Jan. 5, 1948), esp. pp. 113–14, 126; H. Rept. 1845, 80th Cong., 2d sess. (Final Report on Foreign Aid of the House Select Committee on Foreign Aid Pursuant to H. Res. 296), pp. 551–56; International Emergency Food Council, *Report of the Secretary General to the Fourth Meeting of the Council* (July 1947), pp. 73–75; and *ibid.*, . . . *to the Fifth Meeting of the Council* (October 1947), pp. 48–49.

The various countries and products have not shared equally in the recovery to date. In the United Kingdom and Eire, farm output has recently been even larger than in 1934–38. In Italy, Spain, Portugal, Switzerland, the Scandinavian group and maybe France, current production is apparently close to 90 percent of the prewar average. In sharp contrast, Germany, Austria, Poland, Hungary, and Yugoslavia have grain and potato crops that appear at least 20 percent below prewar levels, and their output of animal products is probably even lower. Extensive war destruction, social and agrarian reforms, and population shifts have operated against speedy agricultural recovery in these countries; and in Germany, reduced supplies of fertilizers and farm machinery have been important contributing factors.

Among the various farm commodities, animal products have recovered less fully than products of vegetable origin, and pig and poultry products less than other animal products. These relationships are normal in periods of food shortage, since animals—particularly pigs and poultry—compete with human beings for grain. Certain crop-structure changes since prewar years also appear significant. Particularly impressive are the sharp fall in the rye acreage and big percentage increases in the areas devoted to vegetable oilseeds, fibers, and tobacco. Yet rye remains a major European crop, and the oilseeds, fibers, and tobacco are still very minor crops.

Prospective Recovery by 1952

Let us now consider the prospects for further recovery by 1952 in (1) the ERP countries, and (2) the countries east of the "iron curtain."

Volumes have been written on the economic plans and prospects of the ERP countries; and their agricultural production goals and import requirements have been subjected to close scrutiny by American experts. I shall merely summarize, therefore, what these plans suggest with regard to future production in the ERP countries (including Western Germany). The original estimates in the *Report of the Committee of European Economic Cooperation*[3] broadly indicated that prewar crop and livestock levels could be restored by 1950–51 in most of the ERP countries. Indeed, the over-all pro-

[3] U. S. State Dept., Pubs. 2930 and 2952 (released September and October, 1947). See also revised estimates in *ibid.*, *Commodity Reports . . .*, pp. 81–104.

duction goal for that year was put above the 1934–38 average. Significant net increases in production were anticipated for coarse grains, potatoes, oilseeds, sugar, tobacco, fruit, milk, and eggs, with no appreciable change from the prewar level in the total output of bread-grains and a decline in meat production largely confined to Western Germany and the United Kingdom. As a group, these countries expected to have more cattle, sheep, and poultry, but fewer horses and pigs, than in 1934–38, with practically all the decline in pigs concentrated in Western Germany, Austria, and the United Kingdom.

In analyzing these estimates, American experts suggested that the grain crops might well be increased more rapidly and livestock numbers and animal products less rapidly. The American estimates thus implied that prewar production levels for meat, milk, and eggs would not be fully restored by 1950–51 or even 1951–52; and they indicated that sheep, as well as pigs and horses, would probably still be below their prewar numbers. Furthermore, even the increased grain figures of the American experts implied a lower *per capita* output of grain in the ERP countries in 1951 than in 1934–38.

Greater uncertainties are involved in trying to appraise the prospects for agricultural recovery in Soviet-dominated Eastern Europe The Committee of European Economic Cooperation assumed that the flow of agricultural surpluses from Eastern to Western Europe would be resumed during the next few years and that the flow of cereals would reach prewar proportions by 1951.[4] This view, however, is open to question on several grounds.

Let me present a few of the pieces in this complex jigsaw puzzle. We have already noted that agricultural production in most of the eastern countries is still substantially below prewar levels within comparable boundaries—perhaps a fourth or more below in Poland and Eastern Germany, a fourth to a fifth below in Hungary and Yugoslavia, and a fifth to a tenth below in Rumania, Bulgaria, and Czechoslovakia. Land redistribution in Eastern Europe—particularly in Poland, Hungary, and Rumania—has reduced the size of most farms to dimensions normally associated with inefficiency, and it has increased the area cultivated by farmers with little "know-how."

These considerations and also experience with the agrarian reforms of 1918–21 suggest that full recovery of farm production may

[4] Vol. I, p. 43.

be delayed a number of years in several of the Soviet-dominated areas. Yet only for Poland is this prospect clearly indicated in the published agricultural plans. The Polish plan calls for a total agricultural output in 1949 equal to only 75–80 percent of the prewar level; and full basic recovery, therefore, seems out of the question by 1951. In contrast, the plans of Yugoslavia, Bulgaria, and Czechoslovakia all specify significant increases above prewar levels by or before 1951; and even for Hungary the Communist Party plan envisages recovery to 95–100 percent of the 1938 level by 1949–50.[5] Finally, though less complete information is available for Rumania, the grain area planned for that country for 1949 closely approximates the prewar average, while substantial increases are indicated for sugar and the major industrial crops.

We may well ask what major assumptions underlie the optimistic plans of the Eastern countries and whether these are realistic. All the plans assume increased mechanization, more fertilizer, improved seed, better cultural methods, and a broad shift toward greater diversification and intensification of agricultural production. In the past, such changes have come only gradually in backward countries; but many Communist planners in Eastern Europe are convinced that these improvements can be introduced rapidly under state guidance through the agricultural cooperatives they are promoting. The Yugoslav plan is one of the most optimistic, counting on yields per acre in 1951 typically 10–20 percent higher than on the average in 1934–38 and on increases in livestock ranging from 15 percent for cattle to 70 percent for hogs. To outside observers such optimism seems unrealistic.

The outlook for grain exports from Eastern Europe is influenced also by the prospective changes in economic structure that all of the plans envisage. Increased emphasis is put on industrial development and, in agriculture, on pig-raising and sugar, fodder, and industrial crops. Part of the acreage required for the enlarged crops is to come from reduced sowings of one or more major grains—of maize in Yugoslavia and Rumania, of wheat and rye in Hungary, of wheat and maize in Bulgaria, and of rye in Poland and Czecho-

[5] Bank for International Settlements, *Seventh Annual Report* (Basle, June 1947), p. 156; United Nations, *A Survey of the Economic Situation . . .*, pp. 135–39; France, Ministère de l'Economie Nationale, *Etudes et Conjuncture, Economie Mondiale*, July–August 1947, esp. pp. 96–97, 113–15, 140–42, 146–47; *Foreign Agriculture* (U. S. Dept. Agr., Off. of For. Agr. Relations), February 1948, p. 37; Canada, Department of Agriculture, *Agriculture Abroad*, various issues.

slovakia. Several of these countries, however, plan larger areas of other grains than they had in the prewar period, and most of them anticipate that increased yields per acre will go far toward offsetting their reductions in grain area.

It is impossible to foresee how these and subsequent plans will affect the grain production of Eastern Europe. The generalized plan to reduce sowings of grain and to expand other crops and pig-raising is in line with the observed tendency to intensify and diversify production on smaller farms. But it seems unlikely that the current poor farming conditions and practices in Eastern Europe can be improved rapidly enough to raise yields per acre materially by 1951; if not, the reduced grain acreage will mean a correspondingly reduced production (with average weather).

Two other questions are involved in the outlook for grain exports from Eastern to Western Europe: (1) How much grain will the Eastern countries use at home? (2) How much will they send to the USSR? Only a bold person would hazard specific answers to these questions. I shall merely discuss three factors that have an important bearing on the answers. Here and elsewhere, I take no account of the unforseeable changes that would be introduced should there be a critical worsening of American-Soviet relationshps.

First, the food use of grain in Eastern Europe will presumably be affected by population changes. The present population of Poland and Czechoslovakia is perhaps 20 percent *smaller* than the average for the same boundaries in 1934–38, while that of the four Danube exporting countries is less than 5 percent larger.[6] Even with appreciable increases by 1951, the total population of the satellite areas will probably be 8–10 percent *smaller* than in the prewar period, reductions in Poland and Czechoslovakia more than offsetting the estimated net increase of 6–8 percent in the Danube exporting countries. If there is no significat change from prewar years in the *per capita* consumption of grain for food (which seems possible), the population changes in these areas will bring corresponding changes in the use of grain for direct human consumption.

Second, the amount of grain retained in Eastern Europe for livestock feeding during the next five years will depend largely on the rate of restoration and expansion of the depleted herds of that

[6] The population approximations in this paper are based mainly on estimates in *World Population Estimates* (U. S. State Dept., OIR Report No. 4192, Mar. 1, 1947), and United Nations Statistical Office monthly releases on population.

region. The agricultural plans of all the Eastern countries call for exceedingly rapid increases in livestock numbers, with emphasis on pigs and poultry—animals that are heavy consumers of grain and potatoes. Fulfillment of these plans necessarily depends on the production of good crops, on a moderate (rather than large) flow of grain reparations to the USSR, and on relatively light exports. It seems most reasonable to anticipate that the increase in grain production will be slower, and the volume of grain exports and reparations larger, than would be consistent with attainment of the present livestock goals. Beyond 1951 the outlook is even more uncertain. If the Eastern countries carry out their present intentions to intensify and diversify their agriculture and to emphasize livestock raising, their former grain surpluses may virtually disappear; and they may offer for export increased quantities of livestock and animal products—grain "on the hoof" and in refrigerator cars.

Finally, we want to know whether the grain and livestock surpluses of Eastern Europe will flow eastward or westward. This will probably depend primarily on the desires of the Soviet Union, whose present five-year plan calls for a total grain acreage in 1950 about 8 percent *smaller* than the average for 1934–38 within the same boundaries. In spite of the planned cut in acreage, the USSR is counting on a 1950 grain production 12 percent above the prewar average—to be achieved by a remarkable 20-percent increase in yield per acre.[7] Whether the USSR will or will not need substantial grain imports in 1950–51 depends heavily on what portion of the planned increase in yield is effected. Fulfillment of the plan would permit the Soviet Union to take care of the grain needs of her own population (which is expected to be 6–8 percent larger than in the prewar period)[8] and also to provide more than enough grain for her own livestock.[9] But if there should be a negligible increase in grain yields per acre, the *per capita* supply of domestic grain would be reduced by perhaps 10–14 percent, suggesting the need for substantial net

[7] To insure comparability with 1950 goal figures, yield and production comparisons here and elsewhere are based upon 1934–38 averages for Russia's enlarged territory, roughly adjusted to refer to biological yields.

[8] Based on estimates in U. S. State Dept., *World Population Estimates*, and Frank Lorimer, *The Population of the Soviet Union: History and Prospects* (League of Nations, Geneva, 1946).

[9] Announced livestock goals for December 1950 specify smaller pig and horse numbers than in 1938 (down some 3 and 24 percent, respectively, in comparable boundaries) and substantially larger cattle and sheep herds (up 10 and 65 percent, respectively). These goals appear very optimistic in view of the depleted state of Russia's livestock in 1946.

imports. Even so, Russia's import requirements would be smaller than the decline in the per capita supply figures might suggest, since the Soviet Union used part of her prewar grain supply for export (an average 1.5 million tons yearly) and part for feeding more grain-consuming livestock than she seems likely to have in 1950–51.

Perhaps it is most reasonable to anticipate that the USSR can get along quite well in the early 1950's with small to moderate grain imports and reparations. The enlarged Soviet population will also require, however, increased imports of meat, cheese, and other animal products if anything like the prewar per capita consumption of these products is to be restored by 1951 (and even the prewar level was low by Western European standards). Yet in the future, as in the past, Russia's actual trade in grain and other foods seems likely to be determined less on the basis of calculated need than on the basis of unpredictable political policy.

Let me now summarize the main points of the preceding discussion in so far as they pertain to grain—the most important item on the ERP import list and the chief product moving from Eastern to Western Europe in the prewar period. The ERP countries need unusually heavy imports of wheat and feed grains during the next few years; and their growing populations and present agricultural plans suggest that their import needs in 1951–55 will still be considerably higher than in the prewar period. American farmers want to know where the increased grain imports will come from, particularly after ERP is ended. The CEEC countries appear to have been unduly optimistic in counting on restoration of the prewar westward flow of grain from Eastern Europe after 1951. Not only may less grain per capita be produced in the Eastern area in the early 1950's than in prewar years, but more grain may be retained there for feeding increased numbers of pigs, chickens, and other livestock that are destined partly for export, partly for increased domestic consumption. Equally significant is the possibility that the USSR may shift from an export to an import basis for grain and that she may also import substantial quantities of animal products.

The sizeable grain exports from the USSR and the Danube Basin during the past year may appear to shake some of these insecure conclusions. The Soviet Union and a couple of her Danube satellites signed trade agreements in 1947–48 for the exportation of about 4 million tons of grain, compared with average prewar exports of 6 million tons from the USSR and all Eastern exporters (including

Eastern Germany). Some people accept this as evidence of the re-emergence of a true grain surplus in those countries. More probably the explanation lies in the temporarily depleted livestock herds and in the restrictive bread rations, forced collections, and other grain controls in the Eastern area. As livestock herds are restored and expanded and food controls are relaxed during the next five years (if they are), smaller rather than larger exports of grain may be expected. Here again, however, political motives may dictate less rational and more restrictive policies.

If these very uncertain prospects are borne out, Argentina, Australia, Canada, and the United States will be called on to supply the increased grain imports the Western European countries want, so long as means of payment can be found.

Imports Under the Recovery Program

On all the ERP import lists suggested by various experts, grain far outranks every other agricultural product in terms of value, followed at considerably lower levels by cotton, fats, meat, sugar, fruits, tobacco, and dairy products. It seems probable that substantial quantities of all these commodities will be purchased with ERP funds, but the Economic Cooperation Administration (ECA) may decide otherwise.

It is important for American farmers, other potential American pressure groups, and consumers in the ERP countries to understand clearly the guiding principles ECA officials must follow *if the Recovery Program is to be a success*—successful in fulfilling the objective of the Foreign Assistance Act of 1948 to aid the participating countries "to become independent of abnormal outside economic assistance" by June 30, 1952—independent at a high, not a low, level of production and trade. Such success would presumably mean that American consumers would be increasingly well supplied with desired European products, that American taxpayers would be freed from the burden of making heavy grants to Europe, and that American farmers and industrialists would have a wider European market for their products than in prewar years.

Such a high degree of success cannot be achieved easily. With Germany lagging, it will be difficult enough to raise the production of Western Europe even to the prewar level. And it will be still more difficult to close the gap in the balance of payments of the ERP countries, because they have lost foreign investments that in 1938

netted about a billion dollars a year. The magnitude of the problem involved is indicated by the conservative American estimate that the ERP countries will have to expand their merchandise exports some 30 percent above the prewar volume just to pay for imports of prewar size.[10]

The success of the Recovery Program, therefore, is not assured. It is possible only if there is unprecedented cooperation among the ERP countries themselves, and if top officials in those countries and in the ECA continuously act in the spirit of the Foreign Assistance Act. Reflecting this spirit, Administrator Hoffman declared forcefully last July: "We are not distributing relief . . . .We are, from my standpoint, investment bankers for recovery."[11]

Spelled out in more specific terms, this guiding principle would seem to mean that ERP funds should be spent so far as possible on the importation of *production goods* and "know-how"—that the smallest possible portion should be spent on immediate *consumption goods*. Indeed, expenditures on consumption goods appear warranted only in so far as they are essential to the maintenance of health, political freedom, and economic efficiency in ERP importing countries or in so far as they promote efficient export industries in ERP exporting countries. But all import requests—including those directly or indirectly designed to increase the productive power of the ERP countries—should be scrutinized as to their probable contribution to satisfactory solution of Europe's difficult balance-of-payments problem. And ERP funds should be used to stimulate only those industries that have a fair chance of survival on a competitive basis after ERP is ended.

Let's consider how the ECA authorities, in their role as "investment bankers for recovery," might deal with a few specific import problems. Both the CEEC and our own government experts have suggested that the ERP countries import in every year of the ERP period considerably more meat, cheese, processed milk, dried fruits, wine, tea, and tobacco than they imported on the average in 1934–38. And particularly for the later years of the program larger imports are also specified for eggs, fresh fruits, and fresh vegetables. Every one of these products ranks as a luxury-consumption item and should be inspected critically. Moreover, special attention

[10] U. S. Congress, Senate, Committee on Foreign Relations, *Outline of European Recovery Program: Draft Legislation and Background Information submitted by the Department of State . . .*, 80th Cong., 1st sess. (Dec. 19, 1947), p. 70.

[11] U. S. Dept. Comm., *Foreign Commerce Weekly*, July 24, 1948, p. 14.

should be given to the proposed inadequate imports and planned reductions in per capita consumption of bread grains, fats, and sugar —the cheaper foods that can normally be counted on to help balance the budgets of needy nations as well as needy families.

Consider first the proposed wine, tea, and tobacco imports. None of these products is essential to the maintenance of health. But since the bulk of the wine imports and about half of the tea imports would come from ERP countries and their dependencies, the ECA might well question whether support of these industries would contribute to later balance of Europe's foreign accounts. This possibility does not exist for tobacco, which would be purchased mainly from the United States with ERP dollars badly needed for other United States exports. In general, it would seem reasonable to approve only the minimum imports of each of these products required to maintain public morale unless support of the wine and tea industries should appear justified as a good recovery investment.

Somewhat different problems are raised by the high import allowances suggested for fresh fruits and vegetables. The ERP countries and their dependencies would supply all of the vegetable imports and most of the fresh fruits. Encouragement of vegetable and fruit production in these countries is probably warranted, because it is in line with recent consumption trends and also with the tendency to develop a more intensive agriculture in Western Europe. In contrast, the use of ERP funds for financing imports of Western Hemisphere fruits would almost certainly operate against the success of the Recovery Program.

More important are the proposed increases in imports of meat, cheese, and eggs. The suggested imports would leave the over-all supply and consumption of animal products in Northwestern Europe materially lower than in 1934–38, but still considerably higher than in most other parts of the world, and higher also than health considerations alone would demand. The animal-product consumption problem of the ERP countries is thus mainly a psychological problem which warrants further investigation. The problem is particularly hard to solve because the dollar cost of imports is heavy and the suggested increase in imports—destined mainly for the United Kingdom—would be difficult or impossible to maintain after the ERP period. There is the additional question as to whether a larger proportion of the animal-product consumption of the ERP

countries could not be produced more economically at home. Northwestern Europe, with its dense, educated populations and favorable climate, is especially fitted for intensive, scientific farming in which livestock are important. Smaller imports of animal products and (if necessary) larger imports of grain to permit more rapid increase of some of the domestic herds would put less strain on the Recovery Program and also promote better long-run adjustments.

This partial solution, however, would raise the question as to where the increased imports of feed grains could be obtained. Under existing conditions (which include government price and export controls for both meat and feed grains, long-term contracts for prospective meat surpluses, and increased consumption of meat in the United States and a number of other countries) there is no assurance that the ERP countries could secure extra supplies of feed grain even if dollars were made available for that purpose. Yet it is possible that the ECA could make special arrangements with some of the exporting countries to divert more grain to the international market. And it is possible that Argentina, faced with an assured foreign outlet would adjust her agricultural price structure to encourage early restoration of her higher prewar levels of production and export of corn. These and other possibilities might well be investigated before ERP funds are used for increased imports of animal products.

In any case, one of the elements essential to rapid economic recovery in Europe is the acceptance of consumption levels considerably below prewar standards. It is necessary to encourage as much investment as is consistent with health, political freedom, and economic efficiency. Just as the German people were told that they could not have both "guns and butter," so the people of Northwestern Europe must be made to understand that they cannot have both meat and machinery in large quantities. This does not mean that hunger is to be condoned or tolerated: indeed, the calorie-intake level should promptly be raised in several of the ERP countries—especially Western Germany. It means not less food than in the prewar period, but less palatable food—more cereals, potatoes, fats, and cheap vegetables; less pork and other preferred animal products, less overseas fruit, and less tea and coffee. Perhaps the greatest danger inherent in the Recovery Program is that the various countries will try to maintain (with ERP funds) consumption levels that they cannot now afford and that they will still be

unable to afford after 1952 if the ERP funds are used improperly.

The degree of success of the Recovery Program will be determined not only by the decisions and actions of officials in the ERP countries and in the ECA, but also by the decisions and actions of other officials in various contries. Particularly needed now are appropriate actions to combat inflation, to discard unsuitable price and marketing regulations, to allocate increased supplies of fertilizers, feed grains, and machinery to the ERP countries, and to modify all exchange and trade policies that handicap either the Recovery Program or the balancing of Europe's trade accounts.

Meaning to American Farmers

Now let me summarize briefly what the European Recovery Program and the recent and prospective developments in European agriculture may mean to American farmers.

The most obvious result is an increased four-year demand for the major export crops of the United States—especially grain, but also tobacco and cotton. These products have usually accounted for some two-thirds of the value of United States farm exports, they have been in excessive supply in many years since 1931, and large exportable supplies can be expected in the future. But whether the increased ERP demand should be accounted a benefit or an affliction depends on whether it can be sustained after 1952. A purely temporary demand on our currently inflated markets would merely postpone and make more difficult the eventual downward adjustments in price and production that would be required.

The chief question, then, is: Can American farmers reasonably expect a much heavier export demand for their products after 1952 than existed in prewar years? Under conditions of actual and prospective peace, the answer seems likely to depend primarily on four factors: (1) on whether the Western European countries (including Germany) will want to import increased quantities of these products from overseas; (2) on whether they wil be able to produce enough exportable goods and services to pay for increased imports; (3) on whether the United States will be willing to make the needed dollars available; and (4) on whether American farmers will be willing to sell their chief export products at prices that are internationally competitive.

I have already indicated that present signs point to a redirection in European agriculture that will provide an expanded market for

overseas grain so long as means of payment are forthcoming. And the increasing population in Western Europe as well as the general upward trend in per capita consumption of tobacco suggest that the import demand for this product, too, may be permanently increased in the absence of payment difficulties.

The chief basis for hope that the ERP countries will be able to finance increased imports lies in our Recovery Program. If the funds made available under that Program are spent with due emphasis on imports of production goods and "know how," the productivity of these countries could conceivably be raised enough to expand their exports 30, 40, or even 50 percent above the prewar volume. Since a 30-percent increase is required just to pay for imports of prewar size, an appreciably larger increase is necessary if Western Europe is to contribute substantially to the desired expansion in world trade. Such a goal is undoubtedly ambitious; it can be achieved only through austerity in consumption, hard work, good judgment, and the abandonment of traditional, inefficient methods of work.

It is perhaps difficult to avoid a "defeatist" position in considering the supply of American dollars likely to be available for financing European imports from the United States after 1952. This hinges on the willingness of our country to take imports from other countries. Our past record in this respect has been bad; many of our present laws and institutions are based on erroneous concepts of the relationship of imports to American prosperity; and our Congress has many members who have no understanding of the economic principles of international trade. Yet the situation is not hopeless. We can point to the reciprocal trade agreements sponsored by the United States, to the efforts, to the efforts of our State Department in promoting the International Trade Organization, and to the realistic attitude that Congress has shown during the past five years in dealing with pressing international economic problems.

The next obvious step is for the Congress and the Executive Departments actively to encourage suitable imports. Without such a new approach, American farmers and industrial exporters cannot hope to sell heavily to foreign markets after 1952—unless, of course, American taxpayers are willing to "foot the bill." When this idea is widely understood, and when our Congress finally learns that no American industry can be "protected" from foreign imports without correspondingly reducing the foreign markets available to other American industries and American farmers, more appropriate trade

legislation will be passed. It is important, however, that this change not be delayed too long. Many of the pressing economic problems likely to be faced in the coming decade could be partially solved by an expanding world trade. And only the United States, the world's leading creditor, is in a position to take the initiative in relaxing import restrictions and in actively searching for suitable imports. Heavier American imports would mean heavier foreign exports which, in turn, would purchase heavier American exports.

If American farmers could count on a satisfactory solution of the dollar problem and on a heavy European demand for overseas wheat, tobacco, and cotton after 1952, they could look forward to widened opportunities to export their major surpluses. These developments would provide American farmers *opportunities to export, not guaranteed export markets.* Whether our agricultural exports would be large or small under these conditions would depend on American farm prices. Past experience, current American farm legislation, and the existing high level of agricultural prices in this country all point to the danger of American farmers pricing their own products out of potential foreign markets by insisting on government price supports at excessive levels. Continuation of this policy would be extremely short-sighted. It would result (as high export prices did earlier) in the expansion of grain, tobacco, and cotton production in other exporting countries and in the establishment of European trade barriers designed to encourage increased domestic production of grain and synthetic fibers. One can only hope that American farm organizations will abandon their insistence on high government price supports before it is too late.

In conclusion, then, a number of difficult problems must be properly solved before American farmers can count on lasting favorable effects from the European Recovery Program. Several of the solutions depend upon appropriate cooperative action by foreign and American government officials. But the American agricultural price problem, at least, must be mainly solved by American farmers themselves.

DISCUSSION*

LOIS BACON

Mrs. Farnsworth's excellent paper has brought into sharp relief what the European Recovery Program means to the American farmer—a chance

* A discussion given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

to retain and perhaps expand his prewar export outlets in Europe in the more distant as well as the immediate future. Admittedly the odds are long, but I think it must be added that without ERP there would be virtually no chance of keeping these export outlets open on a self-financing basis.

Among the various problems discussed, prospects for agricultural production in eastern Europe and east-west trade in farm products seem to me of particular interest. Restoration of the trade between eastern and western Europe is generally emphasized as vitally important to the economic recovery of Europe, and is one of the expressed aims of ERP. Mrs Farnsworth, however, suggests the possibility if not the probability that eastern Europe's agricultural exports will be smaller than before the war and will be directed eastward rather than westward. In this case, the flow of trade between eastern and western Europe could hardly attain the desired proportions.

Few impartial students of the area would disagree, I believe, with the conclusion that if prewar consumption levels are maintained or increased, eastern Europe's agricultural export surplus will for some time be smaller than before the war, for it is difficult to envision any likely set of circumstances under which per capita production in eastern Europe can be quickly restored to the prewar level. Even for a gradual recovery, eastern Europe needs a period of more or less settled political and economic conditions. Such a period may be indefinitely postponed by the recent drive for collectivization of agriculture.

Should Soviet control over the satellite countries be strong enough to force through collectivization rapidly, grain production may be expected to fall and livestock numbers would probably also decline. How much collectivization would reduce the level of output is impossible to say, but unless a very heavy drop occurred it would not necessarily be fully reflected in exports. The collective system of farming permits a high degree of state control over output, and, while the eastern European countries might not be willing or able to go so far as the Soviet Union, strong Communist governments would perhaps have little hesitation in curtailing or holding down consumption in order to export when it suited their purposes. Like the Soviet Union, the eastern European countries are intent on fostering industrialization. If this aim is given high priority, they might export substantial quantities of grain and export them to the west, provided that the west agreed to send in exchange the needed machinery and industrial equipment.

The urge to industrialize will remain and may even be given freer rein if the eastern European countries are able to maintain a measure of independence from the Soviet Union. On the other hand, actual collectivization of agriculture may not be pushed. Continuation of small-scale peasant farming, which now characterizes the region throughout, is consistent, as Mrs. Farnsworth stated, with the planned shift in emphasis from commercial grain to livestock production. It would also mean virtually no control over farm deliveries, so that increases at least in farm consumption could not be prevented and the recovery in output for sale would probably

lag behind the recovery in total production. Nevertheless, a significant volume of agricultural produce, perhaps weighted more heavily with livestock products than before the war, might be offered to the west, again provided that it was the means of securing machinery and industrial equipment.

To mention the conditions for drawing agricultural products from eastern to western Europe may be only to underline the unlikelihood of a flow in that direction. As Mrs. Farnsworth has pointed out, the Soviet Union may need grain and will certainly need livestock products if per capita consumption is to approach prewar levels. Without attempting to predict the future, it seems improbable that the Soviet Union would permit the diversion of available supplies to the west unless it received something urgently wanted in return. If this proves to be so, the question remains as to whether the west can or will wish to meet Soviet desires in order to obtain food from the east.

There are two other points I should like to consider briefly in the time remaining. The first concerns agricultural recovery in western Europe. Over large parts of the region it has been impeded not only by shortages of means of production and unfavorable weather but also by the critical economic situation. Lack of confidence in the currency and scarcities of consumer as well as producer goods have weakened the farmer's incentive to exert himself to the full since he has been unable either to save money with any feeling of security or to invest as much as he would like in his farm and household. Perhaps the most effective aid to agricultural recovery provided by ERP is the opportunity to stabilize currencies and otherwise give the farmers a compelling motive for increasing output. Unless the most is made of this opportunity and made soon, production plans in a number of countries are likely to be unfulfilled.

The second point has to do with trade between the ERP countries. This trade, the restoration of which is so vital a part of European economic recovery, has been retarded by the use of foreign trade and exchange controls in nearly all ERP countries to confine imports to staple foods and other commodities considered essential to national recovery and by the shortage especially of European exportable goods that the ERP countries consider essential. Europe is covered with a network of bilateral agreements, but with both parties to the agreements in most cases striving to obtain much the same essential goods, avoid taking luxury and semi-luxury goods, or what are classed as such in the present emergency, and at the same time equalize the flow of trade between them, the actual exchange of goods has been below the level warrented by physical availabilities.

If some of the obstacles to intra-European trade are minimized through the recently adopted plan for using a part of the ERP dollars to help finance that trade, agricultural exports, which are an important source of foreign exchange for a number of ERP countries, should benefit. This will tend to increase gross imports into ERP countries over present low levels of some of the more expensive kinds of foods and speciality products, since they make up the bulk of western Europe's agricultural exports. Wine and fresh vegetables are outstanding cases in point in that exports from ERP

countries plus French North Africa, which stands in a special relation to France, cover practically all the import requirements of ERP countries, and in addition wine is sent overseas. Incidentally, the CEEC figures I have seen suggest a reduction in wine and fresh vegetable import requirements during the ERP period as compared with the 1934–38 average.

The more one looks at some of the uncertainties and difficulties connected with even a few of the problems confronting those responsible for the operation of ERP, the more impressive the size and complexity of their task appears and the greater the inclination to stress, with Mrs. Farnsworth, that the success of the program will not be easy to achieve. Yet it also seems important to me to bear constantly in mind that ERP offers a hope and the first real hope of at last emerging from the crisis that has plagued us since the close of the war.

ROUNDTABLE ON PROBLEMS OF GRADUATE STUDENTS

Chairman: E. L. Butz, Purdue University

CAN GRADUATE TRAINING RISE ABOVE INSTITUTIONAL "INBREEDING" OF IDEAS?*

K. E. Ogren
University of Minnesota

"INBREEDING" of ideas implies that viewpoints and ideas are accepted without independent thinking and analysis. A high quality graduate training cannot be achieved if such "inbreeding" of ideas takes place. A major goal of graduate study is the development of an ability to think effectively and to utilize techniques of analysis in order to independently arrive at relevant value judgments. The development of independent viewpoints is especially important in a social science field. The social scientist is often forced to make decisions when there is insufficient evidence or adequate standards of value from which a conclusively true or false judment can be reached. Dogmatic acceptance of ideas presented during graduate training will not be adequate preparation for future decision-making under different environmental conditions.

Can graduate training rise above institutional "inbreeding" of ideas? The graduate student must first reorient his perspective toward objectives of education, if he has not already accomplished this during undergraduate training. Much of the educational value of undergraduate study is lost because the student's attention is focused on learning the informational facts prerequisite to the grades and credits necessary for a bachelor's degree. Too often the student expects specific answers from the professor, while the professor is so intent on presenting informational facts and developing his own viewpoints that he does not encourage independent thinking on the part of the student. Reorientation of the student's thinking and educational perspective is not solely his responsibility. Many of the ideas and judgments acquired from institutions such

* A paper given at the Annual Meeting of the American Farm Economic Association at Green Lake, Wisconsin, September 14, 1948.

as the family, church, and other school levels were based on biases, prejudices, and ineffective thinking both on the part of the individual himself and the personnel of these institutions. Likewise, in graduate training, avoidance of "inbreeding" of ideas is a responsibility both of the student and the graduate faculty personnel.

First, the department or administrative head has a definite responsibility—that of building a staff which can acquaint students with a diversity of analytical tools and techniques of analysis. Departmental "inbreeding" is often associated with a policy of recruiting staff members who were trained at that institution. However, this is only one of several "danger signals" that may exist. Faculty members coming from different institutions may all tend to emphasize one particular approach, such as empirical, theoretical, or institutional. More than one regional environment should be represented in the faculty membership as well as indiviudals who received their educational training during different time periods. These are neither necessary nor sufficient conditions for a diversified staff, but they can be regarded as positive indicators. The general role that the department head himself plays is important. Are other faculty members encouraged to express points of view that may disagree with the philosophy of the department head? Or does he tend to build a faculty which is in agreement with his particular philosophies?

Specific "inbreeding" of ideas may arise, to a large degree, through the individual staff members in their classroom and other contacts with graduate students. The instructor's function is more than description and explanation, it is also judgment and appraisal. But these judgments and appraisals should not be presented as final truths. The student should obtain from a course of study not the final answers, but a motivation toward additional study and research that will aid him in arriving at his own independent evaluations. The instructor reflects, quite naturally, what he believes most important in his classroom lectures, assignments, and also in his examinations. The instructor must be on his guard to acquaint and direct students to a variety of viewpoints and analyses, particularly through his reference assignments. Grades and examinations are perhaps a necessary evil in graduate work. But the examinations should be concentrated on testing the student's ability to apply analytical tools of analysis, not the memorization of informational facts or a reiteration of the instructor's own value judgments.

The presentation of too much classroom material may also be harmful because the student will have so much to think about that he will be forced to rely solely on the instructor's appraisals.

Finally, the graduate student himself must accept a responsibility for the diversification of his training. He can obtain a diversity of viewpoints and ideas from a wide range of reference books and professional journals that are at his disposal. He is not necessarily limited to the environment and particular approach of a single institution. However, attendance at several institutions does not by itself provide a satisfactory solution to this problem of "inbreeding" of ideas. A college or university which offers graduate training, particularly Ph.D. programs, has a definite responsibility to build a staff of the capabilities described earlier in this paper.

SPECIALIZATION VS. DIVERSIFICATION IN COURSE WORK*

H. G. DIESSLIN
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THE first academic economist, Adam Smith, probed into the nature and causes of the wealth of nations. He pointed out the economic policies in his time that would lead to the greatest political and social welfare of the individual countries and the world,

As this social science developed during the century following Smith, it became a more abstract, "ivory tower," deductive, theoretical analysis centered around maximizing profits of the individual firm and to a lesser degree the industry. It tended to seal itself off from the aspects related to the political and social welfare of society. Economics, like many of the social sciences, evolved and developed around a hub without seeing the rim around the whole economy; consequently, economics as well as other social sciences often exhibited a tendency to be inflexible and unadaptable.

Since the depression of the early 1930's, the government has invaded nearly every phase of our economy; this is particularly true in agriculture. The emphasis of economic analysis shifted from a micro-economic study of the firm to a macro-economic or aggregate approach to the industry and national economy as a whole.

Agricultural economics originally developed around farm management. Today it is not uncommon to find eight or ten fields of major specialization offered by the agricultural economics departments of land-grant colleges. Farm organization and farm management, work simplification, marketing, prices and statistics, finance, policy, land economics, and rural sociology are examples of such specialization.

The typical agricultural economist who has grown up on a farm, attended rural schools, graduated from a college of agriculture, and majored in agricultural economics has no trouble developing a special interest viewpoint. But, does he also have command of the techniques so that he may cope with today's economic problems relating to agriculture from a political and social point of view?

Agricultural economics has developed in the form of empirical observation and analysis rather than pure theoretical analysis because it deals with the practical problems of the agricultural

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industry. Although economic theory is a part of the training of practically all agricultural economists, a controversy continues to rage over the value of theory in this training. Howard Conklin gives an excellent intrepretation and discussion of the complementary relationship of theory and empirical observation in a recent article in this JOURNAL.[1]

In the immediate past there has been a tendency toward extreme specialization within agricultural economics, with the consequence that the place of agriculture in the rest of the economy, its dependence upon the other sectors of the economy, and the tremendous inequalities within agriculture itself have often been overlooked. To refute specialization *per se* is to refute one of the first principles of economics—i.e., division of labor. However, the first responsibility of the graduate student today is to acquire a working knowlege of the tools he needs—economic theory, history and geography, mathematics, statistics, research technique, political science, sociology, logic, etc. Along with this foundation of general working tools, the graduate student has the opportunity for moderate specialization in both his Master's and his Ph.D. theses.

Whereas research in agricultural economics in the past often has been built primarily around the goal of maximizing profits for the individual farm or firm, today it must also take cognizance of questions pertaining to state and national agricultural policy and long-run social objectives of agriculture. To illustrate, problems of agricultural policy include the short-run instability of income and agriculture's place in and dependence on other sectors of the national economy. Questions of long-run social objectives include soil, timber and water conservation, income inequality within agriculture, and migration of excess labor out of agriculture.

The tools and techniques needed to cope with the research problems involved in agricultural policy and social or welfare projects are not to be found through extreme course specialization. The graduate student equipped with a broad working knowledge of the analysis tools of his trade, yet moderately specialized through the application of some of these tools in his thesis projects, can readily adjust himself to further specialization on the job. This should hold true if he is called on to do a piece of research involving a commodity, the firm, the industry or the national economy.

[1] H. E. Conklin, "A Neglected Point in the Training of Agricultural Economists," this JOURNAL, Volume XXIX, No. 4, November, 1947.

DUAL RESPONSIBILITY BETWEEN THE GRADUATE ASSISTANT AND THE UNIVERSITY*

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FINANCIAL assistance in the form of teaching and research assistantships has a close relationship to the number of graduate students that embark on professional careers in the rural social sciences and to the progress of their work. Such assistance, as revealed by a study of the recruiting and training of personnel in this field made about eight years ago, extended to one-third of all graduate students enrolled in agricultural economics.[1] This did not include those students engaged in hourly employment or fellowships. In light of recent expansion in certain phases of research, particularly in marketing, it is quite probable that those students on assistantships now embrace a higher proportion of all advanced students than in 1939–1940.

An assistantship in the recognized sense is a salary paid to a graduate student for work performed in assisting a professor with teaching and/or research or in the preparation of material for extension teaching. Over the years, a working relationship between the student and the department or university has evolved, in which the student is willing to accept a relatively low wage in return for experience under professional guidance, and the university is willing to help a student financially in return for aid in performing many of its minor staff functions. From personal observations, the duality of responsibility in effecting or bringing about more fruitful results to both is met with a great deal of variability. Some students look upon appointments to assistantships much as they would to outright grants or subsidies, purely a reward for past academic achievements, and barely meet the minimum work requirements; others, realizing the opportunity such apprenticeships can afford, enter into them with a great deal of enthusisam and an attendant love of learning. Institutions, on the other hand, may reflect an acknowledged responsibility for the intellectual growth and development of its graduate students as prospective agricultural

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[1] Schultz, Theodore W., *Training and Recruiting of Personnel in the Rural Social Studies*, American Council on Education, Washington, D. C., 1941.

economists and well-informed citizens; or the institution may seem to be more interested in extracting as much menial labor as possible without regard to the all-round professional development of the individual.

The graduate schools are the spawning grounds for future teachers, research workers and administrators. At this early or preliminary stage of recruitment into the profession, when graduate assistants are selected by a department, certain obligatory arrangements or responsibilities come into being as in any employer-employee relationships.

The primary responsibility that falls upon the university is that of providing professors who are competent and conscientious in outlining the work programs assigned to graduate assistants. The student usually accepts an appointment with the thought that such an arrangement will constitute a means of broadening his experience, of acquiring some insight on practical scientific methodology, and of benefiting from the association with and counseling of professors on the staff. To be stuck off in some cubicle, as the chief engineer of an inarticulate calculator hardly measures up to his aspirations. Nor should it. Many departments attempt to provide some work of a supervisory nature for graduate students by having them work with quiz or laboratory sections. Many faculty members merely coordinate the planning of the work so that assignments in the various sections cover the same materials. In other instances, however, we find the type of faculty member who is especially interested in the teaching assistantship and therefore holds periodic group discussions of instructional problems with the teaching assistants.

The same may be said of faculty members who head research projects that are "farmed out" to research assistants. Some merely lay out the next mechanical job. Others, at a sacrifice of their own time for class preparation and other duties, spend hours in explanation of statistical procedures, theoretical implications and alternative methods of inquiry related to the problem.

By giving the background of the problem situation, by explaining the many methods of approach that have been tried and then discarded as inadequate, by making clear the reasons for following a particular procedure, much time and effort a graduate student might otherwise spend in pondering and retracing alternative procedures is saved. Not to do so may mean that the graduate assistant

in the process of carrying out his responsibilities may come up with many "new ideas" only to discover that they were old ones. If an assistant goes through such an experience four or five times, he soon drops the idea of bringing up new suggestions. Effective counseling and guidance on research projects or other work assignments can serve as real touchstones of professional development for the student, can provide an efficient means of training and can contribute to the over-all objectives of the department as well.

Many department members rightfully believe that they are responsible for considering whether or not a given graduate student may be able to use his graduate training in the future as he has planned. For example, one of the main values of a teaching assistantship for the graduate student is that it might show him whether or not he is a person who ought to plan for college teaching and take the doctorate as part of that plan.

Agricultural economics is a business of pronounced specialisms because of the regionality that characterizes agricultural problems. This, combined with the danger that a great deal of "inbreeding" of the ideas may take place often has led to research methodology or methods of inquiry that are highly particularized at each institution. Since graduate assistants are unduly exposed to the particular methodology employed at institutions which they are attending, I believe that it is the responsibility of such institutions to also present other approaches in order that the student may become aware of and appreciate the characteristics and functions of other applicable techniques in the realm of research and analysis.

The responsibility of the student, of course, is more than "putting in 20 hours each week for the Department." Timeliness in getting assigned tasks completed is important. However, unlike many employers, the university does not concern itself with the time element, the punching of a timeclock, but rather with the quality of the work that is being turned out.

The graduate assistant certainly owes to the university his finest scholarship. Scholarship is not just a matter of learning what to know, but rather, in making the greatest contribution to the working relationship we are discussing, of learning what to do with that which he has found. Indeed, from the standpoint of the assistant's own self-interest, he should utilize to greatest advantage the opportunity presented to him by the use of the university's physical facilities and the association and exchange of ideas with the staff.

However, undoubtedly the greatest contribution of the graduate assistant is an implicit one. A professor is usually required to divide his energy among many concurrent activities. He may turn to his colleagues on the staff for suggestions and discussion of particular phases of his work, but other staff members frequently are acquainted only in a general way with his specific problems. The graduate student may be among those best qualified to offer constructive criticism and advice. This means that the assistant must take an active and not a passive role in carrying out his responsibilities. Perhaps one of my professors has most amply stated the relationship when he said that he constantly looks to his graduate students, particularly the assistants with whom he is intimately working, for intellectual stimulation and criticism.

For an effective working relationship between the graduate assistant and the university, the flow of responsibilities is not channeled nor shuttled indiscriminately in either direction. Rather, there must be a constant interflow of ideas, judgments and constructive criticism. Whenever a professor forgets this, he passes up an opportunity to teach and inspire—to make a contribution to his profession; whenever a student assistant forgets it, he passes up an opportunity to learn—to better fit himself for his profession.

HOW TO STIMULATE GRADUATE STUDENT INTEREST IN PROFESSIONAL PUBLICATION*

CARL W. ALLEN
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TO BEGIN, I believe we must recognize that the topic of this paper deserves more than passing interest or merely an academic discussion. From information I have from editors of various professional journals, it seems that both the quality and quantity of articles submitted by graduate students could stand improvement. Apparently there is no editorial policy of the journals which necessarily work against publication by graduate students. On the other hand, there is no obvious policy which would encourage graduate students to submit for publication. This might be a good place to start—have one or more of the journals adopt an editorial policy that would encourage submission of articles by the graduate students and younger staff personnel. The two groups are almost synonymous.

It would be very easy to suggest some of the more obvious means of stimulating interest of graduate students in professional publication. We might put on a contest with a prize or other recognition of the winner or we might suggest a special issue of the journal each year containing only graduate students' articles or even a section of each issue devoted fully to work of the grad student or younger staff member (say within five years from date of obtaining an advanced degree). Among other things, this might result in some discrimination.

Rather than putting on a campaign to ballyhoo the objective and entice students to submit articles, I believe more would be accomplished if we could dig under the surface to get at some of the basic causes why such a small percentage of published articles are authored by persons while in graduate student status.

As I see it, there are three main reasons why graduate students do not write and submit more articles for professional publication. If remedial action is taken on these, the editors will work a little harder reading manuscripts.

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First, there is the lack of encouragement and help by the students' major professor (or in some cases, the minor professor). Very few of us are in a postition to recognize the value of an article or idea. Nor are we familiar enough with previously published material in every case to know whether or not our ideas are sufficiently original to warrant consideration. The only solution to this is more careful thought by the student and his major professor. I realize we are all rushed for time and the pressure of other work is strong. However, a slowing up of the tempo might very easily accrue dividends. Not to be overlooked at this point are those cases where a certain amount of "exploitation" of graduate students takes place.

The notion of infallibility is the second main cause hindering graduate students in writing and submitting articles to the journals. For the most part, I suspect we have been led to think that an article which has been printed is the last word on that subject. Nothing further from the truth could exist in our minds. I believe part of the blame here can be put on the professors. This attitude must certainly be modified so as to look upon a journal article as a means of laying on the table a well thought out idea in the hopes of stimulating further thought by one's colleagues too distant for direct consultation. The number of persons in any particular field is growing quite large. No one can be expected to know them all. Writing articles for a journal serves as an introduction to other workers with similar interests.

The very nature of the work graduate students are doing works adversely toward publication. Too many graduate students work on pure statistical manipulations—applied work applied to a local situation—as a thesis. The results of this work are often considered suitable for publication locally and not generally. Professional publications tend somewhat in the direction of generalized theory, development and general application of principles and laws which apply to a wide range of phenomena. The solution to this seems to lie in the leading of students to develop and apply steps of deductive analysis, refinement of theory as applies to situations, and the theoretical solution of their problems (since these are actually important steps in research methods). They should also see how, in broad terms, the basic theory or principles of the "local" problem ties in with the over-all economic problems.

Articles in professional publications should not, on the other hand, serve merely as a "quibbling" ground. Some notes and arguments

published are boring to read because they amount to little more than a difference of opinions as to spelling, punctuation, etc. There are other instances of using an article or note under one topic to accomplish a far different purpose.

Graduate students have no desire to get out on a limb with no means of retreat. They think this will be remembered by prospective employers and work adversely toward their obtainment of a position.

As soon as the present notion of infallibility can be shoved aside and replaced with what should be the true spirit and intent of journals—a common meeting place of ideas—and if we can get our professors to do a little "prodding," I think we will have improved our percentage of articles considerably.

After all, the mere awarding of an advanced degree does not in and of itself qualify an individual as an author. Too often, this is assumed to be the case.

I firmly believe graduate students have fertile ideas though oftentimes undeveloped. They may hesitate to express them without proper guidance.

VOCATIONAL GOALS OF THE GRADUATE STUDENT*

C. L. Scroggs
North Carolina State College

STUDENTS in rural social sciences feel the full impact of problems encountered in graduate study when those problems become hindrances in the achievement of vocational goals. This is particularly true when such problems result in training deficiencies that limit the student's qualifications for a wide scope of job opportunities. The cumulative result of such shortcomings in academic preparation is brought to focus even more sharply when they prevent vocational advancement in whatever employment the student accepts at the end of his graduate training.

Outstanding among the problems which handicap many graduate students in achieving their vocational goals are those which have been so ably described by the preceding discussants. Certainly it seems reasonable that some prospective employers might discriminate against applicants from a graduate center which has a reputation for institutional "inbreeding" of ideas. On the other hand, such applicants might be at a definite advantage when being considered by employers who are themselves inculcated with the one-mindedness of "inbreeding." Another equally handicapping circumstance is that of educational provincialism which results when a student's entire academic training, undergraduate and graduate, has been taken at the same institution. Acquaintance with only one state or region and training in only one intellectual approach definitely limit breadth of viewpoint. This situation is even more harmful in departments where the graduate student too often is looked upon as a building brick that may be broken or forced into place in order to contribute to the over-all program of an institution or an exploitative advisor. These inadequacies alone offer justification for ranking a student's eligibility for employment below that of applicants whose backgrounds include more than one intellectual climate.

A further restrictive situation is that of narrow specialization in one field. Too definite opinions as to fields of work may close the door to graduate students for other employment possibilities. In

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 14, 1948.

this case, ofttimes, the student becomes a specialist not through his own choice but because there is lack of flexibility in course work outlined for completion of his graduate training. A candidate whose graduate work ends with the master's degree is most often the victim of these rigidities in requirements. This sort of inflexibility usually is established by curriculum committees or by department heads without careful thought being given to plans that would enable the graduate student better to qualify for his vocation, be it academic work, a public career, his own business, or employment in the various fields of industry. Stress is placed upon the degree rather than upon plans and methods essential in *quality* of training. By the same token, in personnel recruitment more attention is given to degrees than to ability and competence. It is only natural, therefore, for graduate students to fall into the conventional degree-earning pattern. In other words, the degree has become a sort of vocational insurance and the trademark required for preferential consideration in job placements.

What, then, can be done by rural social scientists to assist graduate students in achieving their vocational goals? The answer is not simple, and the solution, with its many facets, is not one to be solved by graduate centers alone. The responsibility must be shared by all rural social scientists, whether in academic work, in government service, or in industry, all of which would benefit from any improvement in training and recruitment of personnel.

In viewing the over-all picture, it becomes apparent that agricultural economists and rural sociologists have not always informed their graduate students about the wide scope of vocations open to them. Particularly is there a lack of information as to opportunities available in industry, with farm organizations, agricultural cooperatives and other non-academic work. Moreover, any improvement is unlikely to be forthcoming from the environment of many graduate centers. For example, departmental isolationism is too prevalent in land-grant colleges and universities. Staff members in teaching, in research, and in extension too often go their separate ways and keep abreast of new developments and trends only in their particular departments. In turn, graduate students have only the vaguest notions about the work of departments other than teaching. The gap is even wider between staff members in the rural social sciences and their colleagues in the general departments of economics and sociology. Little vocational guidance can be expected when these

conditions prevail, either for graduate students or for undergraduates.

There are three recommendations which will do much toward aiding graduate students in achieving their vocational goals and to better prepare them to meet the dynamic socio-economic problems of our on-going society. It is these which will be briefly considered.

1. There is a great need for vocational monographs which will present objective data on occupations open within the rural social sciences. Such monographic descriptions should be supplemented annually by addenda on new trends and developments. Not only would information of this type give aid to graduate students and undergraduates already enrolled in the rural social sciences, but it would be invaluable in steering undergraduates of high calibre into agricultural economics and rural sociology. Many incoming college students of rural background are completely uninformed about the rural social sciences. They enroll in technical agriculture because their past associations most generally have been with men trained in the technical courses or in vocational agriculture, and there is less likelihood of their changing over to the rural social sciences if they succeed in doing superior work in their first choices.

Vocational monographs would serve an additional purpose when used by staff workers in planning teaching programs and classroom materials.

2. Previous discussion has given emphasis to the need for training and experience in appraising and analyzing socio-economic problems, with special reference to in-service training. This is excellent insofar as challenging in-service opportunities are available, but students also should be given opportunities to develop themselves in non-academic vocations that are of special interest to them. Programs of this type have been used for years by mechanical and engineering schools, and the "Antioch plan" is world famous.

In the field of marketing, for instance, the opportunity to work with any particular marketing function, agency, or commodity might do much in determining job opportunities for an individual. Difficult as the civil service procedure might be, it seems reasonable that some apprentice program could be worked out for brief employment of graduate students in agencies of the Federal government. Since so many students in the rural social sciences take approximately two academic years to complete their program of study for the master's degree, an on-the-job training opportunity

during this period could be an invaluable experience and would provide an insight into vocational possibilities. In turn, staff members handling such programs would be brought into closer contact with their colleagues in non-academic work.

3. Many graduate centers do not have the resources or the facilities to do a superior job in recruiting graduate students and in making personnel placements and/or replacements. Consequently, many well-qualified individuals never receive the consideration which their capabilities justify. In 1941, in a report prepared for the Committee on Rural Social Studies of the American Council on Education, it was recommended that department heads in land-grant colleges and universities should have civil service registers available for use in selecting graduate appointees and staff members. Recognizing that such a plan could not be carried out because of war-time emergencies, it seems warranted to call renewed attention to this recommendation and to the urgent need for its fulfillment.

ROUNDTABLE ON MARKETING RESEARCH

Chairman: Leland Spencer, Cornell University

AGRICULTURAL MARKETING RESEARCH[1]

R. G. Bressler, Jr.
University of California

*Objectives for the Marketing System and for Marketing Research**

WHILE there are many social objectives to which the marketing system may contribute, the direct and fundamental goals for the system appear to be: (1) to provide efficient and economical services and ownership transfers in the movement of commodities from producer to consumer; and (2) to provide an effective price-making mechanism. In an economy that is predominantly one of private property and free enterprise, prices have the function of guiding the flow of resources into alternative employments and the flow of goods and services into alternative uses. Only insofar as the prices established by the marketing system transmit the demands of consumers back to producers and supply conditions forward to consumers with a minimum of lag, imperfection, and distortion will the economy achieve an efficient allocation and economical use of resources in satisfying wants.

From this standpoint the first objective, relating to the efficiency of the marketing system, is seen as merely a specific aspect of the second. The creation of marketing services does not differ from other productive processes in this respect, and the efficient operation of the pricing mechanism includes the economical allocation of resources to marketing employments. Thus the real and direct objectives for the marketing system is to provide for and participate in price formation, with the understanding that the pricing system will have as its prime functions the guiding of the flow of resources into production (including marketing) and of goods and services into consumption. If the marketing system is to be used for other purposes, such distortions as will be induced in the system and in the allocation of resources should be known.[2]

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* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

[1] A paper prepared for the Agricultural Marketing Committee of the Social Science Research Council.

[2] For a discussion of some of these, see O. H. Brownlee, "Marketing Research and Welfare Eeonomics," this Journal, *Vol. XXX, No. 1* (February, 1948), pp. 55–68.

If these are accepted as the general objectives for the marketing system, it is possible to indicate more specifically the objectives for marketing research. The following outline, while not all-inclusive, probably covers the major points:

1. To describe the organization and operation of the existing marketing system;
2. To determine the basic functions governing the production of the several marketing services;
3. To estimate the effects of changes in organization and operation on the physical inputs costs, and outputs (services) of the system;
4. To determine demands and preferences for marketing services (as distinct from demands for goods plus associated services);
5. To combine these into descriptions of new and more economical systems;
6. To contrast these results with the costs and prices characteristic of the existing marketing system in order to delineate sectors and areas where the process is inefficient and uneconomical;
7. For these problem areas, to study the marketing institutions in order to understand why and how they have led to distortions;
8. To recommend changes in the institutions that will achieve or at least encourage the desired adjustments; and
9. To test these recommendations by actual application.

The "Ideal" Market Concept

The objectives for the marketing system have been defined in terms of "efficiency" and "economy." These are, however, relative or comparative words. A marketing firm, function, or system cannot be judged as efficient or economical in any absolute sense, but only relative to alternatives or to some standard. Studies may be designed to show how the existing marketing methods could be improved, i.e., made more efficient and less costly. To be most useful, however, marketing research should be oriented with reference to some concept of an ideal or perfect market. Such a concept should make possible the most meaningful appraisal of the existing system, both in terms of delineation of problem areas and of indications of the magnitude and importance of the distortions. *At the same time it should provide a framework within which individual studies could be fitted, past work evaluated and integrated, and future research planned.*

What, then, can we use as a model of perfection? At least a partial answer is suggested by the above mentioned objectives for the marketing system, for they correspond in general to the results which would characterize an economy of perfect competition. For such an economy, economic theory describes an interdependent system

of pricing for factors of production, for goods, and for services. Within this system factors will be shifted among alternative employments in response to higher and more profitable returns. In turn, these returns will change and adjust with changes in technology and with shifts in consumer tastes and preferences. In equilibrium, costs of production (including the production of marketing services) will be at the minimum consistent with the *given conditions of resources technology, and demands.* Prices for goods and services will reflect and differ only by these production and marketing costs.[3]

Competitive economic theory can thus provide the framework for our ideal market. Confronted with any marketing and pricing problem, the research worker can plan his attack by asking himself such questions as "How would this marketing process be organized if it operated under the conditions of perfect competition?" This does not imply that competitive conditions could be completely attained, nor that the solution to marketing problems is simply a "return" to the system of free and perfect competition. A realistic view of the industrial economy of today indicates that it would be *both undesirable* and impossible to attain many of the characteristics of a competitive market. Two main types of modifications are necessary: first, the inclusion of welfare considerations that modify the distribution of income, such as progressive income taxes and minimum wages; and second, the possible advantages of a limited number of firms in those areas where economies of large-scale operation are important. In this last case, the significant questions are "What organization of this process would minimize costs and how can these costs be reflected in prices?"

Attempts to improve marketing by approximating competitive conditions will be appropriate in many instances. These include such things as curbing large-scale organization where its effects are primarily to exact charges not commensurate with costs, and perfecting knowledge through research, education, and market news. In certain other areas, however, this approach will not be productive and here the stress must be on approximating the *results* of competition in terms of costs and prices. As already mentioned, large-scale organization may frequently result from technological factors

[3] These concepts are generally familiar to readers of this JOURNAL, so no attempt will be made to develop them in detail at this point. For a specific discussion of the perfect market in time, place, and form, see G. S. Shepherd, *Marketing Farm Products*, Iowa State College Press (1946), pp. 399–409.

that give rise to economies of scale, and the curbing or breaking up of such large units would necessarily lead to higher costs. This is a much more common situation in marketing than is sometimes supposed, for economies of scale are frequently of sufficient importance relative to the size of local markets to result either in (1) a considerable degree of local and spatial monopoly or (2) a number of small and highcost competing firms. In country marketing and processing plants, for example, this conflict is clear. The problem may be one of how to achieve and regulate low-cost monopolies in the public interest.

To conclude this section, the following list suggests some of the benefits that this ideal market concept can bring to marketing research.

1. It provides standards by which to judge the existing system by standards of *socially desirable results* or ends.[4]
2. The underlying principles are well developed and widely understood, and with careful thought they can be expanded to apply to such detailed problems as the organization and operation of local marketing facilities or to such broad issues as the allocation of resources among marketing and the other major sectors of the economy.
3. It stresses the importance of theorizing and logical analysis in the planning phases of research; *relationships are not determined by random gathering and tabulating of data*, but must be inserted as well-conceived hypotheses and then tested by carefully designed empirical studies.
4. By suggesting the general form for particular studies, it will help insure that the findings can be used in succeeding and more advanced studies. This should facilitate and promote effective integration of research and cooperation among research workers.
5. By stressing the important interrelationships and interdependencies in the workings of the economic system, the ideal market concept should encourage researchers to go beyond superficial and gross relationships. *The real market mechanism is complex, and some appreciation of these complexities is essential if research simplifications are not to destroy the usefulness of the estimates of basic relationships.*
6. Finally, by providing a "goal" that will frequently differ significantly from the *status quo*, the ideal market concept should encourage the exploring and developing of new areas of knowledge. Innovation is essential to progress and (research that contributes to progress is simply a scientific approach to innovation.)

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[4] This is not to deny that welfare considerations will sometimes define other results, as already mentioned, but in most instances, and particularly in the details of marketing research, the competitive model appears consistent with the general welfare in terms of results.

Suggestions for Future Marketing Research

The foregoing paragraphs have discussed the general objectives for the marketing system; some more detailed objectives for marketing research; and have advanced the concepts of perfect competition and of the ideal market as the logical framework within which to develop this research. The paragraphs that follow attempt to interpret these ideas in terms of several types of work. For obvious reasons this discussion must be brief, and emphasis will be on the nature and content of each field and the logical interrelations between the several fields. While dividing the work into a number of separate fields or categories seems desirable from the standpoint of exposition, these divisions are arbitrary and actual research projects will frequently fall into two or more fields.

Descriptions of the Present Marketing System

Marketing research has frequently been criticised on the grounds that its results are "descriptive," yet this cannot be a fault in itself. It may be true that some of the work has not progressed beyond description of an introductory or background character, or that the descriptions have been superficial or in other respects inadequate, but the fact remains that a clear picture of the organization and operation of the marketing system is essential to further progress. The general content of such studies will not be elaborated at this point, other than to stress the need for descriptions that will provide results useful in following phases of the work.

The Production of Marketing Services

If estimates are to be made of the inputs and costs that would characterize an ideal market or of the potential savings that would result from changes in the existing market, the fundamental relationships governing the production of marketing services must be known. In this phase of the research, it may be helpful to visualize the marketing system as a composite of two primary functions: (1) plant operations (including stores, warehouses, and processing plants); and (2) transportation operations involving the movement of products through space (including local assembly, inter-plant and inter-market transportation, and delivery). After studies have been completed for these functions, they should be combined into de-

scriptions of the marketing system as a whole under existing and alternative organizations. From the standpoint of the general objectives for the marketing system, as contrasted to the particular objectives for individual firms within the system, the ideal market involves the efficiency and economy of the entire process. This type of research should result in estimates of the effects of modifications and reorganizations of the marketing process on costs and services.

The Demands for Marketing Services

The definition of an ideal marketing system cannot be made on the basis of production efficiency and low costs alone, for the system is concerned with the production of those services that are wanted and demanded by consumers. Some changes in the marketing system, such as improvements in internal plant efficiencies, will tend to reduce marketing costs without changing the essential nature of the services provided. In many cases, however, changes in the system will be reflected in changes in the services and in the conditions surrounding these services.[5]

This field is almost unexplored, and it presents some very difficult problems for the research worker. The demands for products and for associated services are joint demands. Only limited alternatives with respect to services are actually available to consumers in most markets and for most products. In some cases the price differentials associated with alternative services are fixed through administrative controlled processes rather than through the free operation of the market. Some potential alternatives, and especially those that would be involved in important changes in the marketing process, are entirely unfamiliar to consumers. Furthermore, some of these alternatives are mutually exclusive so that it would be impossible for consumers to express their preferences through the usual operation of the market. In spite of these and other complications, information on consumer demands and preferences for services are essential if real improvements in marketing are to be achieved. The first and most difficult task in this field will be to devise satisfactory research methods and approaches.

The Delineation of Problem Areas

When fundamental studies of the production of and demand for marketing services have been completed, they may be combined and

[5] Brownlee, *op. cit.*

synthesized into detailed and quantitative descriptions of ideal market organizations, and the ideals compared with the existing market and price structures, but it remains fundamental. These comparisons will provide meaningful measures of the efficiency of the present system in terms of the ratio of costs under the ideal system to costs under the existing system, and therefore will indicate both the direction of and the magnitude of desirable changes. Unless the research is brought to this point it cannot contribute greatly to the improvement of the marketing system, nor will it satisfy marketing researchers who have some sense of social obligation.

This approach of combining production and demand conditions to describe ideal marketing organizations is by no means the only method of delineating problem areas in marketing. Some problems are apparent on the basis of familiarity or inspection: congestion, duplication, and unutilized capacity in markets and marketing agencies are good examples. Others may be indicated by studies of non-competitive elements in the market; market sharing, discriminatory pricing, market domination and price leadership are obvious examples.[6]

One further approach should be mentioned here, since it may be very useful in indicating problem areas and directions of desirable change. An important and necessary condition for achieving the results of perfect competition and of the ideal market is that value of the marginal products for a given factor will be equal in the several alternative employments for, if any inequality exists, the social product could be increased by shifting resources from low to high yielding employments. With these conditions in mind, *it is possible to view the marketing system as an aggregate* and to compare the returns to resources with those in other sectors of the economy. This approach can be used to indicate sectors where certain resources are over- and under-supplied (where returns to the resources are abnormally low or high) and so to suggest desirable major adjustments in the economy.[7] Needless to say, this aggregative approach could be applied to sub-divisions of the marketing sector.

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[6] See the writings of W. H. Nicholls, including "Reorientation of Agricultural Marketing and Price Research," this JOURNAL, *Vol. XXX, No. 1* (February, 1948), pp. 43–54.

[7] See T. W. Schultz, "Production and Welfare Objectives for American Agriculture," this JOURNAL, *Vol. XXVIII, No. 2* (May, 1946), pp. 444–457.

Studies of Marketing Institutions

The research results at this point will delineate important departures between actual and ideal situations. They will give only partial indications of the causes of these departures, however, and very little information as to appropriate methods of improving the marketing system. Remembering that the ideal market concept is based on the assumptions of perfect competition, some probable causes include: (1) the lack of perfect knowledge by all parties; (2) lack of mobility of resources; and (3) elements of monopoly arising from size, location, or product and service differentiation. Each situation must be examined carefully to determine how such factors influence the market.

This should be accompanied by studies of the social, legal, and economic bases for the existing marketing institutions and of the probable effects of changes in these institutions. In this way it will be possible to select appropriate methods for modifying the marketing system along the indicated lines. In some cases these may involve governmental action in providing services such as market news and grading or inspection. In others the appropriate action may be legal proceedings under the Sherman Act in an effort to preserve competitive conditions. In still other cases, especially where dissolving large-scale marketing agencies would lead to higher costs and prices, public intervention in the form of control, regulation, and even ownership may be indicated.[8] In any event, economists will require the assistance of other social scientists and lawyers in this phase of the work if the recommendations are to meet the double test of effectiveness in improving the marketing system and acceptibility to the general public.

Testing the Results of Marketing Research

An essential part of scientific research is the testing of hypotheses prior to the drawing of general conclusions, but the nature of marketing research frequently places it in a peculiar position in this respect. While it is true that hypotheses will be made and in a sense tested through the procedures suggested above, the results must remain as tentative estimates of the effects of indicated changes on marketing costs and on prices. These estimates can be tested only

[8] See F. V. Waugh, A. C. Hoffman, and Albert Meyers, "Agricultural Marketing Policy," a statement submitted to the Temporary National Economic Committee, February 21, 1941.

by actual application by sample firms or in sample markets. In short, final testing will represent the actual use of research results.

It may be argued that the jobs of disseminating research results and putting them into action should be carried on by marketing specialists in the Extension Service and in various Federal Agencies. But it is important that research workers follow the progress of the first stages of this action program and that studies be designed to check actual results against the research estimates. Such checks will permit an appraisal of the research methods and thereby lead to improved estimates and recommendations in future studies.

Integration with Other Fields of Economic Research

The above discussion has been limited almost entirely to the particular problems of marketing and of marketing research. The marketing and pricing system serves to tie together and integrate the whole economy, however, and marketing research can make a similar contribution to the general field of economic research. Studies of the allocation of resources within agriculture as well as between agriculture and other sectors of the economy, of inter-market prices, and of inter-regional and inter-enterprise competition involve the results of marketing research. Moreover, the basic concept of perfect competition can be applied to all of these problems and, with modifications such as have been noted, can provide a standard for the "ideal economy" that parallels the ideal market concept. The full development of this concept and its application to the important problems of the economy will require the coordination and integration of marketing research with the work in many other fields.

Conclusions

This discussion of marketing research has not developed new fields or drastic changes in approach and methodology. Rather it emphasizes the exploitation of existing methods and tools through a series of coordinated and integrated studies. While such ideas are not revolutionary, the fact remains that much of the research in this field in the past has not achieved such integration. Agricultural marketing research has resulted in many published studies in the period since World War I. In spite of this output, it is seldom possible to combine these into meaningful descriptions of the existing markets; of conditions that would characterize ideal markets; or to give *solutions to pressing marketing problems.* This does not imply

that the past work has been without value, but rather that potential values have not been fully realized.

The Reasearch and Marketing Act of 1946 serves to emphasize the importance of research integration, and to stress the need for carrying marketing research through to specific recommendations as to ways of improving the *system*. A program of research along the suggested lines should make a real contribution to this and to the general welfare. (It cannot be expected, however, to work miracles by providing a panacea for all of the ills of the economy!)

DISCUSSION*

MAX E. BRUNK
Cornell University

Professor Bressler has well summarized the objectives for the marketing system. He has given us some specific objectives of marketing research and has indicated others in more general terms. In addition, he has at some length advocated the use of a budgetary or synthetic approach in the determination of unit costs under conditions of maximum efficiency. I agree with his conclusion that he has not developed new fields or suggested drastic changes in approach or methodology. His paper has stressed the need for integrating marketing studies, not only within agriculture but between agriculture and other segments of the economy, so that meaningful descriptions of and solutions for broad marketing problems can be made. Thus, his so-called "ideal market" would "provide a framework within which individual studies could be fitted, past work eyaluated and integrated and future research planned."

The "ideal market," according to Professor Bressler, is not a completely satisfactory common denominator because it would be both undesirable and impossible of attainment. He suggests several modifications in keeping with welfare considerations and economies of scale. As for the latter, he is concerned with curbing the so-called evils of monopoly on the one hand while maintaining its benefits on the other. There is no evidence that such efforts to date have yielded anything to be desired in actual practice over the present marketing system. Although it is probably with the *results* of the ideal market that he is concerned, it seems to me that marketing specialists could for many years to come busy themselves with mental exercise in the development of the ideal market concept with its multiple theoretical modifications and still be far from the solution of current marketing problems. As for the need of a benchmark by which to measure accomplishment, it appears to me that the existing market supplies a more meaningful base. Such a base, of course, fails to indicate maximum possible achievement.

It is recognized that there has been some aimless accumulation of facts

* A discussion given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

without regard to some problem-solving activity. Nevertheless, for a number of years now, marketing researchers have been obtaining facts based on well formulated hypotheses which serve to modify some of the basic assumptions behind the ideal market concept. If we must continue to ignore these modifications and return to a static ideal market concept for a framework within which to fit our studies, evaluate past work and plan future work, we can hope to make little progress. This does not deny the importance of competitive economic theory in the formulation and constant improvement of basic concepts, but it does seem to censure researchers for not having used theory in the development of concept modifications in the light of facts which have been thus far developed. Science progresses only to the extent that new hypotheses are developed from the testing of old hypotheses. We cannot expect to make much progress by continually basing our research on concepts which fail to grow. Needless to say, our marketing system today bears little semblance to that envisioned by classical economists.

Not many researchers in marketing can spend their time developing "panaceas for all the ills of the economy," or in devoting their efforts to assembling input-output data into ideal functions without having an eye to practical application by making the necessary modifications resulting from testing under applied conditions. Perhaps Professor Bressler would agree but he has not so indicated in his paper. Most researchers are confronted with the pressing problems which have evolved themselves from previous research. Such studies deal with ever decreasing sectors of the marketing system. More fruitful research will come as more of us become resigned to work on the menial problems, each of which will contribute its part to over-all marketing efficiency.

The field of marketing research, like that of production, requires an ever increasing degree of specialization which will continually add to the problem of integrating marketing studies into new and meaningful descriptions. In the development of both knowledge and basic assumptions, the importance of such integration cannot be denied. Professor Bressler has done an excellent job in making this problem clear. However, it should be recognized that this problem alone constitutes only part of the over-all objectives for marketing research.

DISCUSSION*

L. H. SIMERL

The topic assigned to Dr. Bressler, namely "Agricultural Marketing Research," is so broad that it permits, in fact requires, much selection in the material to be presented. He chose to describe, in proper academic phraseology, the major theoretical goals of the marketing system and the theoretical objectives of marketing research. No doubt this kind of work is of great importance, but I regret that Dr. Bressler did not illustrate his points with specific examples and suggest some definite commodity problems for investigation.

* A discussion at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

One might question the assumption that our enterprise is predominantly free. Certainly there are very large areas of our economy where prices do not perform the function of guiding production. Consider, for example, all services performed by federal, state, and local governments, and by industries whose prices or charges are set by federal, state, or local governmental agencies. All together those may include nearly half of all goods and services produced.

The references to price flexibility suggest many interesting points. Compared with prices of most other commodities, prices of agricultural products are remarkably sensitive to changes in supply and demand conditions. Of course we must admit that various governmental policies and programs tend to prevent some desirable adjustments. However, in most instances our agricultural marketing system provides a great flexibility in prices *paid to farmers*. Thus market prices for grain are adjusted to supply demand conditions each day. Prices offered to farmers for livestock, poultry, and eggs respond to day-to-day price-making influences. Butterfat prices are changed daily, or every few days. Whole milk price schedules are adjusted monthly. Prices for most fresh fruits and vegetables are established daily or hourly in farmers' markets. In fact, there are some grounds for arguing that prices paid to farmers often are too flexible, too responsive to changes in supplies and consumer demand.

A highly contrasting situation appears to prevail in many retail markets. All too often retail prices do not reflect changes in prices paid to farmers. This is one of the points upon which we need a lot of research.

This problem may become increasingly acute in the relatively near future. Marketing margins have increased very sharply since 1940. As consumer demand declines, sales will tend to be reduced. At the same time there will be sharp reductions in prices paid to farmers in order to maintain the large margins that have been built into the marketing system during the past eight years. This in turn will bring down a lot of criticism upon "middlemen." Farmers, of course, will be glad to have the blame for the relatively high retail prices directed toward another group, but they will not like the very low farm prices that may accompany such a situation.

The problem of inflexibility in margins has two aspects. One requires ways and means of reducing over-all distribution costs in a period of declining demand. The other calls for methods of securing more flexibility in marketing margins for individual products.

Considerable study has been given to reducing marketing costs, and I suppose that this will be a perpetual problem as long as our economy continues to make progress. In contrast, I believe that relatively little has been done to reveal the relationships, or lack of them, between short-time fluctuations in retail and farm prices of individual products.

This brings up another point. It is that many of the really basic facts about marketing can be discovered only with the cooperation of many individuals and firms whose interests may be jeopardized by the facts that research will reveal. This situation has greatly retarded basic market research in the past. It will provide some of the most difficult problems in the future.

DISCUSSION*

E. W. GAUMNITZ
National Cheese Institute

Agricultural marketing research has come in for increasing attention during the past few years. This interest represents a renewal of the interest exhibited in the twenties. While it is unnecessary to comment on the reasons for the renewed interest—this having been well reviewed by Dr. Black, among others, at the meeting of this group a year ago— it perhaps is worthwhile to note that interest in marketing research occurs periodically but always seems to represent a single point of view, namely, that of increasing returns to producers of agricultural products. (No doubt, in a general sense, the objective can be considered as that of increasing producer returns or reducing consumer prices and narrowing handler margins.)

Dr. Bressler has outlined objectives for the marketing system and for marketing research in terms of "social objectives." Presumably what is stated with reference to social objectives can also be applied in general to research from an institutional or competitive point of view.

The general objectives of agricultural marketing research, as stated by Dr. Bressler, increased efficiency or an efficient marketing system, seem to be well outlined. The specific problem is, of course, that of bringing about these end results.

At the outset it is apparent that certain types of research are relatively easily outlined and the results easily evaluated. Likewise, these are the problems which are more easily attacked. They were the problems, which most of the Advisory Committees, established under the Research and Marketing Act, have advocated as subjects for research. In the dairy field these include such problems as costs and margins, utilization, seasonality of production and marketing, consumption, methods of price determination and the effects of government regulations. These are the problems which we all recognize as being significant. No one can argue about the desirability of a better package for cheese or the advantage and convenience of a quick frozen vegetable.

The problems which are more difficult and those for which the outline of attack is not so simple are those concerned with the utilization of the entire marketing system and the changes, which need to be instituted, to result in the supplying of a more desirable product at the same or a lower price, or supplying of the same product at lower prices.

Involved in this problem is that of attempting to evaluate or appraise the present system and to outline the changes which can be instituted within our general frame of government.

I have only two or three comments to make on Dr. Bressler's paper. As he has defined them, I have nothing to add to his statement of objectives, either general or specific. I would like, however, to comment on two or three things which have a bearing on his general statements.

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* A discussion given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

(1) I agree that much remains to be done in the field of descriptive marketing. The principal criticism of such work is that it has not been fully descriptive. My criticism, objection, or suggestion with reference to description studies would be answered were such descriptions made in the light of a well developed concept of an ideal market. It appears that much of the work which is done under the heading of "Marketing Research" would be better placed were it focused against the background of an over-all theoretical study of an ideal market. Description, in this event, would be more specific and go into greater detail with reverence to the deviations from the ideal concept. Specific detailed studies can then be made of portions of the overall mechanism. Such studies then lend themselves to answering particular questions. In the absence of an over-all concept the analysis of specific or small problems becomes lost in the maze. What I am trying to say is that the over-all or broad concept needs to be set forth first and the specific or detailed studies should follow. The difficulty has been that the over-all is not seen in its proper perspective, in which event the specific makes no sense.

(2) Seemingly, it is commonly assumed that basic data are readily available. This, it seems to me, is one of the fundamental difficulties with all research. The fact of the matter is that we only have available certain statistical information, the accuracy of which at times may well be questioned, and certainly we have very little basic data with reference to the factors which influence particular business decisions. My point is that figures, as such, may be indicators of results but may throw very little light on the causes.

(3) Generally speaking it may be apparent that certain modifications of the marketing system would result in efficiencies. No doubt, all of us have in mind modifications which, if made effective, would result in lower prices to consumers. The problem of stating unequivocably such conclusions and of presenting supporting evidence is quite a different matter. Until some method is devised, under which conclusions are set forth impartially by reputable institutions, it would appear that advantage will not be taken of results that are known.

ROUNDTABLE ON COOPERATION

Chairman: Harold Hedges, Farm Credit Administration

UNSETTLED QUESTIONS RELATING TO AGRICULTURAL COOPERATION*

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I PREFER to emphasize the principles and practices of farmer cooperatives on which there is general agreement, but the subject assigned to me for this paper does not permit that approach. As few of us like criticism even when it is intended to be constructive, it is likely that some of my friends will consider this as wasted effort. Then too there is the doubtful procedure of raising questions and not having time to attempt to answer any of them. I hope that my colleagues on this panel will be able to supply the needed balance.

Cooperative organizations of farmers are relatively new in the United States. While the Grange and other farmer movements spawned a great many of them in the last quarter of the nineteenth century, most of our existing cooperatives are less than 40 years old. It need not surprise us then when we discover that there are about as many ideas concerning how a cooperative should operate as there are cooperatives. There is no complete agreement among our best cooperative leaders nor among our best economists today concerning a number of issues relating to agricultural cooperation.

We are not even in agreement on what a true cooperative is nor on what its objectives should be, and if we do not know where we want to go, how will we know when we have arrived at our destination? Let's look at the record:

W. E. Paulson of Texas A. & M. in addressing this meeting in 1940, concluded with a definition:

"Cooperation is individualism expressing itself in associated action. Cooperation is founded on self-help with a minimum of governmental participation. Cooperation recognizes private property as fundamental in a society of free men. Cooperation helps to preserve the institution of private property by making it universal. Cooperation brings democracy into business through the one-man-one-vote principle in contrast with the aristo-

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cratic tendencies of the private corporation with its share-voting of a concentrated ownership of stock. Cooperation refuses to recognize profits as the motivating force in industry. Cooperation operates to serve its members at the lowest possible cost and not for profits on its investment. Cooperation puts its faith in abundance and low prices in that service, not profits, is its objective. Cooperation supports the competitive system—competition between efficiently operated cooperatives and private concerns. Cooperation eliminates speculation in equities because stock in successful cooperatives cannot have a value above par. Cooperation makes its members an articulate part of the economic system in which they live. Finally, in the words of the great English economist, Alfred Marshall, in his presidential address to the Cooperative Congress in 1889, cooperation is 'at once a strong and calm and wise business, and a strong and fervent and proselytizing faith'."

While I agree with part of his definition and description, I cannot agree with all of it. "Profits" to the members may not be the motivating force in all cooperatives but they are in all that I have ever worked with.

A resolution adopted by the National Council of Farmer Cooperatives in its annual meeting in 1947 stated:

"Be it resolved that this organization vigorously express its deep belief in the profit motive and its free play as being a basic force which can maintain permanently a great and prosperous nation."

A statement I like was made by E. Fred Koller at this meeting last year when in discussing the place of cooperatives in a capitalistic economy he said:

"Thus we see that cooperatives provide a means of complementing and strengthening the capitalistic economy at its weakest points. While cooperation is clearly not a panacea for all the ills of capitalism, it does perform a positive role in the free enterprise economy by aiding it to achieve a better allocation of resources, higher total production and wider distribution of income. The ameliorating influence of cooperatives in our economy is particularly vital in these days when the free enterprise system is being challenged by the sanguine promises of state-controlled economies that now prevail over so much of the world."

A statement by H. E. Babcock in the February, 1935, issue of the JOURNAL OF FARM ECONOMICS reads:

"One point which my ideal farmer-owned, farmer-controlled cooperative will always bear in mind is that the cooperative is not an end in itself, but a means to an end. The real end is the improvement of the economic positions of the individual members, without leveling them off or averaging them down."

Many people accept this definition but others would broaden it. It is now twenty-five years since Bernard Baruch wrote:

"The cooperative plan was evolved in an attempt ot restore the fair economic relationship which should and once did prevail, between on the one hand, those who produced from the mine and factory, and on the other hand those who produced from the soil. Although agriculture is the oldest and best known business, with certain elements in it exactly like those of any other, it has stood still while younger industries have applied modern methods of control of direction and have gained a disproportionate share of the profits therefrom. Linked with the other elements necessary to success for cooperatives is this consideration: groups cannot live for themselves alone. They have public obligations and relationships to fulfill and sound attitudes to assume on those questions which promote social unrest before they can be sure of permanent foundation. For example, where a cooperative is in a position to dominate the price of its commodity, that price must be fair; a gouging price would strike at the very object of 'live and let live' which is the fundamental impulse of collective farm produce selling. I would counsel the cooperatives, their leaders and their members always to remember that they can never rise superior to the immutable law of supply and demand, which is the unshakable basis of the structure of commerce."

Mr. Baruch would broaden the objective of cooperatives to include the interest of the public in its operations.

Few would deny that in the "Sapiro" days some cooperatives attempted to get monopoly control of certain farm products. Is the anti-monopoly attitude of most cooperative leaders today an acceptance of the fact that it is impossible for a farmer cooperative to gain monopoly control of a product, or is it a recognition of the fact that such control if possible, would not be in the interest of the members or the public?

In speaking before the American Institute of Cooperation Annual Meeting in 1941, Homer Brinkley, general manager of the American Rice Growers Cooperative Association said:

"In our opinion it is now generally recognized that only government can exercise the broad-scale controls necessary for the stabilization of agriculture as a whole. Cooperative effort is by its very nature totally unsuited to such an endeavor. The wrecks of farmers' associations which in past years tried their hands at price fixing, production control and such related endeavors is ample evidence to all concerned that such a program applied to agriculture as a whole by cooperatives would be a dismal failure."

If, however, we were to carry public interest far enough, we would have to ask how co-op leaders who ask for support prices, marketing

agreements and tariff restrictions, would demonstrate that they are in the public interest. Possibly there is a difference between the short time and long time point of view on some of these issues.

Another question might be raised concerning the aggressiveness of mature cooperatives. Generally speaking, young organizations are more "radical" or aggressive than mature cooperatives. We are now in a generation of mature cooperatives for the first time. Is there danger of their becoming too conservative and interested in maintaining the status quo? For example, are the milk bargaining co-ops just as much interested in narrowing dealers' margins as they once were or has their dependency on state and federal orders changed their point of view?

History indicates that cooperative competition in some other countries has been far more successful in holding in check or in eliminating cartels and monopolies, than has any act of government legislation. If this is to be our policy then our cooperatives as they expand and acquire more facilities, with more people assuming the risk of the entrepreneur, will need to be careful that they ask only equal treatment before the law. Legal barriers in industry are also legal barriers to cooperatives. The question as to whether farmer cooperatives today have any special privileges not given other types of business should be adequately answered so that the public will know the facts.

Do the objectives of cooperatives go beyond the consideration of economic need?

At the 1946 Annual Meeting of the American Institute of Cooperation, M. G. Mann, manager of the Farmers Cooperative Exchange, stated:

> "It is my opinion that unless we place just as much emphasis on our educational and membership relations projects as we do on our economic projects, we will lose sight of the true value of cooperation. If this happens, the cooperative movement will eventually turn out to be nothing more than just another way of doing business."

There may be differing points of view here depending upon whether this is part of the "end" or a practical "means" toward the end. Unless the public recognizes that cooperatives do serve in its interest, the climate for cooperatives may become uninhabitable.

Frank Robotka said to the same group in 1946:

> "Cooperation cannot rise above the average level of the understanding and self discipline of the people. We in this country have been too much

concerned about building cooperative organizations and too little concerned about developing the capacity of people to cooperate—that is, *building cooperators.*"

For twenty-five years economists have advised cooperatives to specialize along commodity lines. Have we changed our thinking today or are we out of step? The country store a generation ago stocked everything for everybody and had to give way to streamlined grocery, drug, and hardware stores, and the early co-ops which handled everything were replaced by specialized commodity cooperatives. Today the swing is reversed again and co-op community services which handle farm supplies, service farm equipment, and market farm products, are replacing the specialized local co-op unit. Will modern accounting methods, and good management keep them from avoiding the pitfalls of an earlier generation? Perhaps the G.L.F. system of offering multiple services at one point, but with each group of services under different management, is the answer. If this is carrying out the will of the members then why do some cooperatives stand pat while others change their policies and programs?

Where do we reach the point of diminishing returns on vertical and horizontal integration? Petroleum cooperatives have found it necessary to own their own oil wells, pipe lines, refineries, and retail distribution systems. Cooperatives operating canneries for many farm products today are facing the problem of how to keep their products identified and still get them on the shelves of the corner grocery store. Should farmers operate chains of retail grocery stores in order to have an outlet for their products? Some cooperatives have found and developed foreign markets for their products. What machinery, wholesale and retail, is needed to most efficiently handle such operations?

What should the capital structure of a true cooperative be? Is the revolving capital plan the ideal one or are other plans for handling capital equally practical and cooperative in nature? This question is becoming more important due to the increased investments of members in their expanding services.

Is competition between cooperatives sound and can a satisfactory explanation be made to members and the public?

In the July 1931 issue of this JOURNAL, H. E. Babcock wrote:

"The meanest competition in the world is that between cooperatives.

No cooperative wholesale purchasing service buying for a region can hope to succeed if within that region are other cooperatives trying to do the same job."

If this be true there is "mean" competition in many parts of the United States today. There always was competition between local cooperatives and regional cooperatives, but competition between regionals is relatively new and it is increasing. Will members force some combinations in the interest of efficiency, will competition become costly to the members who finance it, will "personalities" or "service" win out?

Why are not farm people of all ages more informed and interested in the cooperatives that have served them well? Frequently comparisons are made with Danish farmers who almost universally support their cooperatives. In speaking with reference to this issue, Frank Robotka in 1947 stated:

"It has been said that the Danes have a peculiar talent for cooperation. Cooperation is not a racial characteristic. It is a mode of behavior that is learned—hence teachable."

How then can it best be taught and should we try to teach the adult generation today or their sons and daughters? Should cooperation be included in text books at all levels of education as "a" way of doing business—should organizations conduct schools of their own as some of the regionals now are doing, should the co-ops within an area work together on an educational program with vocational high schools as they have done in California and in Wisconsin, should we have American "folk schools," or neighborhood study clubs as they do in Ohio, or should a state association of cooperatives attempt the job as they do in Michigan? Perhaps a sound program would include all of these. Or can you depend on an efficient commodity service doing the job over a period of years without any particular educational program labeled as such? How does doing business with non-members, or the trend in regional purchasing cooperatives to appoint commercial feed dealers as local agents, affect an educational program?

Is it important that the next generation of cooperators be well informed concerning the heritage that is handed to them, and their opportunity and responsibility to carry on? Is teaching farmers how to help themselves less important than a good commodity service? If so, are we training for this responsibility?

Are our regional cooperatives the living examples of democracy that we tell the public they are? John Daniels in concluding his book on American Cooperatives says this:

"Co-ops are not doing so well democratically as they are economically. Indeed—speaking now of their regional and national business organizations—there is an evident rush-and-race to pile up volume and go as fast and far as possible, with more than a willingness, almost a compulsion, to short-circuit democratic processes for speed, efficiency and material results."

Is this true, and if it is what are the implications for the future of cooperatives?

How can you measure the success of a cooperative program? Do you look at the volume of business, the number of members, the net worth, the net margin in comparison with other similar enterprises, improvement in quality of the product, the opening up of new markets, expansion of facilities, the percentage of the consumer price the farmer receives, the cost of feed per dozen of eggs, or per hundredweight of milk, the standard of living of members compared with other groups in our society?

Is the type of services unlimited in which cooperatives may successfully engage? Can they successfully tackle the problem of rural housing? Surely there is a need for it. If they should build tractors why not farm trucks? What is the limiting factor, capital, or volume of business, or trained personnel or something else? What guides can be used in determining this?

Should farmer co-ops keep separate and distinct from city co-ops? Usually they are organized under different laws and frequently they have different objectives. Farm co-ops usually market farm products and purchase supplies used in production. The members' welfare is frequently tied closely to that of the cooperative. City co-ops usually handle consumption items such as groceries, and their own economic status is not closely tied to the success of the cooperative. Should farm co-ops also purchase for members their groceries, carpet sweepers, and washing machines? There are some instances where producers and consumers have worked together amiably, but leaders generally recommend separate and distinct co-ops for farm and city, regardless of whether or not they may want to work together.

Obviously there are many unsettled questions relating to agricultural cooperation, ranging from differences of opinion on ob-

jectives down to actual management details. How then can we as agricultural economists make a contribution toward their solution? Surely we have a responsibility in the field of research. While the pressure is on most of the time to do applied research and service work, there is a basic need for fundamental research in this field.

The problems in marketing and purchasing and in business management will probably receive enough attention, particularly those that apply to cooperatives and commercial business alike, but what of the problems that are peculiar to cooperatives alone? These include the economic, the institutional, the legal, the educational, and the human problems. There is a lot of uncharted territory in these areas of thinking and action as they are related to cooperatives.

Most, if not all of us, would agree that cooperatives are a very necessary part of our capitalistic economy. Personally I believe that cooperatives are as necessary to guarantee the perpetuation of our capitalistic economy as are two strong political parties necessary to perpetuate our American system of democracy.

In the years ahead our research work and our educational efforts must help to determine how this cooperative method of doing business should and will fit into our capitalistic economy, how cooperatives can contribute most in bringing economies into production, marketing and distribution, to the end not only of bringing about a more permanently prosperous agriculture, and a more stable industry, but all of this must be in the public interest as well. This is a real challenge to all of us.

DISCUSSION*

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If Professor Stern's purpose was to stress the need of more and better research and education in the field of agricultural co-operation, few will probably take issue with him.[1] In his revised paper he concedes that there are considerable areas of general agreement. He then devotes about half his paper to a discussion of the views of various people in support of his contention that a lack of "complete" agreement exists regarding a number of questions, mostly concerning the aims and objectives of co-operatives. In the remainder of his paper he raises a number of additional questions.

* A discussion at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

[1] See "Research and the Future of Cooperation" by the writer, *American Cooperation*, 1946.)

Although there is ample evidence of lack of agreement, many will question Professor Stern's choice of some of his "authorities." The writer believes that there is less disagreement regarding fundamentals than is generally supposed, at least among recognized students in the vanguard of co-operative thought. It must be recognized that, although many have contributed to the subject, few have done much penetrating analytical work on the basic economic aspects of co-operation. The views of some of the most prominent of these were not cited.

Granted that there may not be complete agreement among the economists, it is to be expected that there would be even less agreement between the economists and the practical co-operators, because whereas economists consider the longer-run social interest, the co-operators, like other businessmen, consider the more immediate entrepreneurial interest.

A question may be raised as to whether a distinction *with a difference* does not exist between "unsettled questions" and "unsolved problems," that is, problems unsolved in the sense that, although substantial agreement may exist as to underlying theory, problems arise in efforts to apply the theory in practice. It would have been interesting if Professor Stern had undertaken to separate the unsettled questions in theory from the unsolved problems in practice. Most of the questions raised in his paper appear to be unsolved problems in practice.

Even though a question may be settled in theory, practical functioning in a dynamic environment involves a continuous process of adaptation and readaptation. No adaptation is likely to be perfect at a given time or continue to be the best adaptation for long. Hence the best we can hope for is not complete solutions of problems but progress and improvement with respect to them.

It is well that Professor Stern mentioned the need of emphasis on problems which are peculiar to co-operatives as a distinctive type of business organization. This part of the paper might well have been amplified, because these distinctive problems have and are likely to continue to receive less research and educational emphasis than they merit.

I also endorse his implied suggestion that we economists who are working in this field need to integrate our thinking. Thus far, we have been working altogether too much in isolation. The efforts of the American Institute of Co-operation to break down this isolation through the workshop sessions held the past two years are to be commended. Many readers will be interested to know that tentative plans contemplate a two-week seminar on the more fundamental economic aspects of agricultural co-operation preceding the 1949 session of the American Institute of Co-operation to be held at Madison, Wisconsin. The seminar or work shop as a "sweating out" process should contribute greatly to a clarification and crystallization of co-operative ideas in the present stage of their development.

Urgent as the need is for economists working in this field to integrate their thinking, there is also a need for the economists to integrate their thinking with that of workers in sociology, law, political science, etc., and, what is equally important, with that of practical co-operators. A two-way

channel of communication and intercourse between co-operators and workers in the social sciences needs to be kept open and functioning effectively.

Problem Areas. A large percentage of the questions raised by Stern and those he cites relate directly or indirectly to the aims and objectives of agricultural co-operatives. Does this emphasis on aims and objectives reflect the relative importance which Stern attaches to this particular problem area?

Bulletin 15, "Research in Agricultural Co-operation—Scope and Method," by the Social Science Research Council lists 80 research projects classified under 12 headings each relating to a more or less distinct problem area. Although a few of Stern's questions fall into problem areas other than aims and objectives, no questions falling into many of them are raised.

The writer has found it useful to outline the important purposes that research in this field may serve. Among the 15 purposes tentatively outlined, those most neglected appear to the writer to be:

1. To provide a better basis for public policy determination.
2. To bring legal and economic concepts relating to co-operation into closer consistency. (See "Lego-Economic Implications of Co-operation," by the writer, *American Co-operation*, 1946).
3. To provide better tools and criteria for the economic analysis of co-operative problems and for the measurement of co-operative success, of true co-operation, and of the contribution of co-operation to general welfare. (This general purpose has to do essentially with the economic nature of a co-operative as a distinctive form of business organization and its economic role in the economy. It seeks to bridge the gap between co-operation in practice and economic theory.)
4. To provide better materials for the teaching of co-operation on both undergraduate and graduate levels.

Professor Stern properly emphasizes some of the new questions and problems which have arisen as a result of current trends and developments in co-operation, such as the increasing scale of operations, the entrance of co-operatives into new fields of activity, the increasing concentration of power in some co-operatives, the development of integrated co-operative systems of marketing, and so on. These developments not only raise new questions and problems but in many cases give new or added significance to old ones.

What activities are suited to co-operation and what factors control? We are, of course, co-operating successfully in many areas of activity today that were regarded as unsuited to co-operation years ago. This trend will no doubt continue. At a given time, the limits will probably be set primarily by the urgency of the need, the ability of the people concerned to contribute the necessary capital, leadership and management and their ability and willingness to assume the risks involved. The significance of these factors is undoubtedly changing with time. Research and education certainly has an important opportunity as well as an obligation to throw light on this important question.

UNSETTLED QUESTIONS RELATING TO COOPERATIVES AND COOPERATION*

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MR. STERN has raised many significant questions regarding cooperatives and cooperation. Each of the 16 or so unsettled questions he raised merit considerable scrutiny, both by economists and by cooperators. His paper raises the question of terminology which is used in discussing cooperatives. Terms such as: profits, capitalism, competition and cooperation seem to carry a variety of meanings.

Should the term "profits" be restricted to earnings on invested capital, or should it include all of the self-gain economic motives such as savings, services and wages? What is capitalism today? How much stateism, private economic concentration and voluntary groupism is included in 1948 capitalism? Does competition apply only to the market where there is a host of sellers and buyers? Or can we also use the term "competition" to describe the action of large economic groups for self-gain? What is the name of the condition where there is only one seller and that a cooperative? Should the term "cooperation" be applied to a farmer's business organization where it is the only processor and the only merchandiser in the wholesale field?

My few remarks will be devoted to discussing one group of unsolved questions. What is a cooperative? How define a cooperative? How study a cooperative and cooperation?

Many of the roots of the business cooperative go back only a century. The environment in which the cooperative has been maturing has been constantly changing. The literature indicates a wide difference of opinion concerning what it is. During the last half of the past century students attempted to describe and define it in terms of the total society. Recently more attention has been given to the functioning of farmers' business organizations. Perhaps it is time that we attempt a more thorough analysis of the cooperative and cooperation. A few questions and suggestions are offered.

1. What are the principles of cooperation? There is a wide differ-

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ence of opinion. A few months ago, I examined 14 books to find out what they thought the Rochdale principles were. There were 14 different combinations of principles and business practices listed. As all students of cooperation know, the Rochdale Pioneers never recorded any body of principles. There are no Rochdale principles.

2. What are the business and community practices that distinguish a cooperative from other business? Is the cooperative by its nature any different from a proprietorship in credit, price and service policies and practices? Are the relations with members and patrons the only type of cooperative practices which are different from other business?

3. Is the cooperative only a business institution to be measured in terms of productivity and income? Should the effects upon individual members, families, and communities be included? If so, how important are the latter?

4. What are the objectives of a cooperative? Is it price gain, protection of the democratic-capitalistic system? Perhaps these are only means. If so, we should be looking deeper into human motives and especially into that somewhat intangible objective, the growth of human personality. Is the farmer member basically concerned with protecting the family farm, capitalism or even his proprietorship? Fundamentally, he may be most concerned with expressing, protecting and maturing his individualism.

5. How describe the cooperative in terms of capitalism and socialism? The cooperators are loudly maintaining that the cooperative is an institution of capitalism. What is capitalism? What is socialism? We have a mixed system—many types of capitalistic institutions, and many types of state organizations and programs. Under each system both individualism and groupism are emphasized. The cooperatives usually represent voluntary groupism and the state usually compulsory groupism. Many farmers, however, have only one choice, that of selling to or through a cooperative.

6. Is the cooperative to be considered only as a competitive institution? If it is only a means to obtain economic efficiency, it could operate either as one of the market competitors or as the only processor and distributor in a market or for a commodity. In the latter situation, the competition would be among the economic groups.

7. What is the relation of cooperative to democracy? But what is democracy? Does democracy apply only to the political field, or

also to the economic, social and religious areas? Democracy is some sort of a compromise between the individual and the group. So is a cooperative and so is cooperation. Cooperation emphasizes voluntary group effort, a high type of human activity. The cooperatives may have a function to perform in maintaining a favorable balance between individualism and groupism—the foundation of democracy in all areas of life.

8. What is the relation of the cooperative to the environment? In what sort of setting does the cooperative survive and grow? How does the cooperative affect the environment over a period of decades and centuries? By environment we include: stage in the scientific revolution, development of educational processes, and the ideologies and beliefs of the people. The scientific revolution has brought urbanization, concentration, monopoly, centralized control, national economic groups, few managers and many workers, and national interdependence. The revolution has also brought education, leisure, longer life, more possibilities for satisfaction, and hope for the good life. The cooperatives have had their great growth during the past century, a period of considerable freedom for business and hope for man. Today, we are again threatened with centralized restrictions.

These suggestions by no means cover all factors which, in my opinion, should be included in a thorough study of what is a cooperative and what is cooperation. I believe all of the social scientists are needed to prepare an adequate answer to the questions raised.

We will raise a final question: Is the nonprofit nature of a cooperative an adequate reason for the majority of citizens for the exemption of cooperatives from income taxes? Perhaps there are other significant reasons for distinguishing the cooperative, the nonprofit and the mutual businesses from the usual proprietorship and corporation businesses.

MEMBERSHIP AND PUBLIC RELATIONS IN AGRICULTURAL COOPERATIVES*

GEO. W. RUPPLE
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THE extreme complexity of agricultural cooperatives relating to State and Federal laws, financial obligations, patronage refunds, organization policies, social and economic relationship and the continued maintenance of the cooperative position in business today offers unlimited subject matter for educational work in membership and public relations.

Cooperatives in the past and present have developed and are continuing to be motivated because of their economic benefits to members rather than the services rendered and their pace-setting effect influencing prices and production.

Today it behooves all cooperative organizations to employ personnel that have the educational background and capacity to develop cooperative minded leaders and members. The process of educating membership must be developed through various methods and media properly designed solely for this purpose. It is becoming more necessary each year to educate the membership to the numerous advantages, other than economic, that good cooperatives provide their members.

Methods used by successful cooperatives to disseminate information to members in the past have been successful in educating a certain percentage of the membership. The number of cooperative-wise and informed members have served the cooperatives well in advocating and encouraging such necessary measures as diversified facilities, market expansion and increased membership. It is questionable how long cooperatives can continue to prosper without developing a greater percentage of informed members.

Methods now used by a number of cooperatives for the purpose of developing membership relations, I believe, can be renovated to do a better job of accomplishing their purposes. (1) Cooperative papers and periodicals can be better planned and more attractively designed, with greater emphasis on the selection of informational material. (2) Membership meetings designed to present more general cooperative information rather than information based entirely on the local cooperative. (3) A better trained and informed employee personnel should be developed. (4) A youth program

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designed to educate young people on the value of cooperatives and designed to get participation in actual cooperative enterprises. (5) Make educational material available for schools and Universities. (6) Educational clinics in which leaders discuss cooperative procedures with members and others. (7) Use visual aids more extensively among members.

Cooperatives generally have been slow to develop proper public attitudes by which public acceptance to their methods and ideals of doing business is at the best. Not only have cooperatives been slow in this matter but in addition most have failed to maintain a constant continuous program, the usual method being to periodically or on a crisis basis, blast the public with the crucial problem of current interest. This fails to get the desired results because the public mind has not been conditioned by previous constant preparatory information to accept facts as truth from cooperative sources.

Propaganda in the form of anti-cooperative radio broadcasts and anti-cooperative literature has been cleverly circulated by pressure groups. Cooperatives have an important job to do in retarding and debunking this unfair propaganda. A public relations program designed to do this job should be in progress in all cooperatives. Cooperatives cannot depend entirely on educational organizations to do this job, nor can they expect to do it properly without considerable expenditures of time and money.

This problem can best be solved by a combination of oral and printed information properly distributed. Newspaper advertising, news stories, press releases, pamphlets and bulletins are important media when properly used. Radio programs cleverly designed will aid the progress of a public relations program. Every cooperative should have a definite program of presenting information to employees and membership for the purpose of public relations. If every cooperative will strive to take care of local obligations in a well planned public relations program, results generally will be forthcoming. Cooperative leaders and management must stop assuming that the rank and file of independent businessmen and others understand cooperatives. Few people realize what cooperatives have done to benefit the general public in the form of reasonable prices, quality products, production, and allocation of resources. It appears that if all cooperatives develop a good local public relations program first, much will be accomplished to improve the cooperative position in the public eye.

ROUNDTABLE ON SIZE OF FARMS

Chairman: Frank J. Welch, Mississippi State College

THE SIZE OF FARM IN THE SOUTH*

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THE agricultural economy of the Southern States has been dominated for many years by the production of cotton, which is a crop that requires large amounts of hand labor. The heavy labor requirements at chopping and picking time have been a major factor in determining the size of the operating unit. The size of the unit has been fixed to a very large extent by the acres of cotton that a farmer and his family could chop and pick. The average farm family can handle from 8 to 12 acres of cotton. However, in order to plant and cultivate the cotton, the farmer has to have a mule and the necessary one-mule equipment. This means that he has to produce enough corn to feed the mule that he has to have to produce his cotton.

With this type of farming pattern the cultivated land per farm family averages 25 to 30 acres in most cotton areas in the South. In addition, the farmer has an equal amount of non-cropland. This does not represent the size of the ownership units, but it is the acres of cultivated land available to the average farm operator, whether he be owner, renter, or sharecropper. There is a tendency for the size of the operating unit to be about the same, regardless of the size of the ownership unit; that is, if a farmer owns more land than one family can handle, he usually adds one or more families until the size of the operating unit for each family falls within the range of 25 to 30 acres of cropland. In reality many farmers that own sufficient land to operate a large efficient unit are at present operating in such a fashion that their one farm actually amounts to two or more one-horse farms under one management. The system is such that each sharecropper has his assignment of land and a complement of one-horse equipment to go with it.

This system has persisted and continues to persist because of the absolute necessity of having enough hand labor available to handle

* A paper presented at the annual meeting of the American Farm Economic Association at Green Lake, Wisconsin, September 15, 1948.

the peak labor loads at chopping and picking time. If the farmer mechanizes the operations that can be mechanized and reduces his labor force, he has to depend on securing outside help to chop and pick his crop. Many farmers have not been willing to depend on the possibility of securing this outside or transient labor when it is needed.

There is some evidence that this pattern is beginning to change. In the Delta areas, for example, many plantations are embarking on long-range programs that will eventually lead them to complete mechanization. These programs call for a gradual reduction of the labor force and the substitution of mechanical equipment. In many instances it will mean the expansion of the use of other enterprises, such as corn, oats, and soybeans, that can be fully mechanized. A few plantations have already developed their programs to a point where they have around 100 acres of cropland per farm family. This compares with the usual pattern of 25 to 30 acres per family. There are still some obstacles in the way of complete mechanization of the cotton crop, but it is not inconceivable that over a period of the next 10 to 15 years cotton mechanization will be an accomplished fact in the Delta and western cotton areas. As this development takes place, the size of the operating unit will gradually increase. The ownership units in these areas are already relatively large, and very likely there will not be significant changes in the ownership pattern. The ownership units will be operated by a smaller number of farm families. Again, it is not inconceivable that the same ownership units can be operated by one-fourth of the families that are now engaged in operating these farms. One brief example of the possibilities offered by this development might be cited. Normally with hand-labor methods it takes about 150 hours of man labor to produce an acre of cotton. Last year the Delta Branch Experiment Station at Stoneville, Mississippi, produced a block of cotton with 39 hours of man labor per acre. Of this amount 32 hours were hand labor in chopping and hoeing. With the mechanical cotton picker that is now available, the one major obstacle to complete mechanization that still remains is weed control. If this problem can be solved, it will be possible to produce and harvest cotton with not more than 25 hours of man labor. The influence that such a development will have on the size of operating units is obviuos.

The solution to the farm-size problem in the hilly and rolling plains areas of the South and Southeast is not so obvious. In many

of these areas the ownership as well as the operating units are small. In a study of one area in South Mississippi in 1942, it was found that there were three tractors on the 327 operating units for which information was obtained. The average farm family had 27 acres of cropland at its disposal. The traditional pattern of cotton, corn, and a few acres of garden and miscellaneous crops was being followed by almost all operators. This cropping pattern is followed by farmers in all the areas of Mississippi outside the Delta. The size of the unit, together with the cropping system followed, does not allow for the most efficient use of land, labor, or capital. The best land is always planted to cotton, and cotton follows cotton year after year. The unit is not large enough, nor is the land uniform enough to enable the operator to follow a rotation. Neither can he introduce other enterprises that will enable him to make better use of his land. The production of feed and pasture crops for livestock requires more land than he has at his disposal.

The fact that cotton requires large amounts of labor at certain times and only small amounts at other times gives the operator a very uneven labor load. He is worked to more than capacity during certain short periods and is either underemployed or unemployed during the remainder of the year. Because of the small size of his unit, he is limited in the opportunities he has to increase the efficiency with which he uses his labor.

A similar situation exists in the use of capital. In most instances the size of his unit is such that he cannot afford to own even the smallest types of tractor equipment. Consequently, he continues to operate with a mule and half-row equipment. The $7500 cotton picker that can pick 150 acres in a season offers little hope for him, except the possibility that he might join with his neighbors and own one cooperatively, or he might hire one on a custom basis.

Perhaps this picture is too pessimistic, but it is a real one in many areas throughout the South and Southeastern part of the Cotton Belt. This is not to say that farmers will not or should not continue to grow cotton. The fact is that in good times and bad these farmers have continued to grow cotton. The chances are they will continue to grow cotton. It is not a matter of competing with the Delta or western cotton producers. Rather, it is a matter of alternative opportunities. With the system being used by these small operators, their major investment is their own labor; and as long as they get anything for their labor, they can continue to grow

cotton. They simply tighten their belts, reduce their standard of living still further, and grow cotton. For most of them cotton returns a greater income for the time put in than any other enterprises they can turn to.

The basic difficulty is not that they grow cotton but that the size of the unit and the alternative opportunities are such that they cannot make the most efficient use of the available resources.

This leads to the question of what adjustments should be made in the size of the operating units to make it possible to use the available resources. In order to try to answer this question, an attempt was made by the workers who participated in the Regional Cotton Adjustment Study to arrive at what might be considered a minimum size efficient unit for several different production situations. Since this regional study was completed, the members of the staff of the Agricultural Economics Department at Mississippi State College have attempted to refine these minimum efficient units for three type-of-farming areas. All information that could be obtained about crop and livestock, cultural feeding, breeding, and other practices was used in this study. In addition, information was obtained on the sizes and rates of performance of the various farm implements, and yield expectations were collected for all promising crop and livestock enterprises.

With this information and the amount of labor available to the average farm family as a base, projections were made to see what combination of enterprises with what combination of land and capital would give the greatest efficiency in the use of labor and other resources. The income that could be expected with 1943 price relationships was used as the basis for judging the relative merits of the various possible combinations.

In the three areas that have been studied, one of the most promising combinations is a dairy-cotton type of farm. With this type the farmer would continue to grow all the cotton that his own labor force could handle. In addition to his cotton, he would keep a 12 to 15 corn-dairy herd. The feed and pasture for the dairy herd would require a relatively large addition to the land resource. In fact, in order to make this possible, the amount of open land would have to be increased to about three times the size of the average farm unit in Mississippi. This would mean an increase in the size of the operating unit from 25 to 30 acres of cropland to 60 to 70 acres of cropland and an equal amount of pasture. It should be emphasized that even

then the farm would be operated at minimum efficiency. But it would mean that the farm family would have a unit large enough to furnish the labor force relatively full employment and would make possible the use of small-size tractor equipment. This size unit, with perhaps a small amount of hired help during peak periods, can be operated by the average farm family.

The operator of such a farm would not get rich, but he would receive a net farm income which is about twice as large as the average received by Mississippi farmers at the present time. The gross income for this unit with 1943 prices would be around $3000, with a net farm income of around $1200.

In order to refine these results still further, the Mississippi Experiment Station is operating several pilot farms that have been established along the lines of some of the minimum efficient units that have been developed. For example, at West Point, Mississippi, the Station has a 160-acre dairy-cotton unit very similar to the one just discussed. This farm is operated by a farm family that makes all the day-to-day operating decisions. The enterprise combination is planned in advance and at present is made up of 12 acres of cotton and a 20 corn-dairy herd. By using milking machines and a four-corn, walk-through milking parlor, the operator and his family have been able to operate the unit with very little extra help. The farm is operated entirely with tractor power, but the cotton is chopped and picked by hand.

Many other combinations have been worked out for other production situations. In some areas livestock combined with cotton is a promising combination. However, this type requires an even greater adjustment in size than the dairy-cotton combination. The Experiment Station has one beef-cotton type farm near Natchez, Mississippi, that has 360 acres of crop and pasture land. This gives some idea of the tremendous change that will need to take place in the size of the operating units if the production of beef cattle is to become important in many areas of the South.

In these attempts to study the influence of size on the efficiency of the operating unit, every promising combination has been projected in the form of a budget analysis, and in almost all cases the attainment of minimum efficiency with adapted enterprises and machinery will require a substantial increase in the size of the operating units. In addition, it will require improved managerial ability

and capital sources especially adapted to the needs of a long-range adjustment program.

There is not time to discuss the possible ways of achieving these adjustments or the obstacles that are in the way of their accomplishment. It should be pointed out, however, that the solution does not lie with agriculture alone. The provision of opportunities for remunerative employment in industries, services, and trades for some of the people now on farms will be one of the first essential steps in a program to increase the size of Southern farm units. There is considerable evidence that this migration has already been taking place at a fairly rapid rate. In fact, the mechanization that is taking place in many parts of the South is coming as a result of a labor shortage. As these farm families are attracted to off-farm employment opportunities, there will be more land available for the families that remain on the farm. This is the same process that has already taken place in all the other major agricultural areas of the nation. The South is late getting started, and she has yet a long way to go, but there is evidence that she is on her way.

NORTH DAKOTA FARM SIZE TRENDS—AN EVALUATION*

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NORTH DAKOTA farms are considerably larger than they were fifteen years ago. The general public, and the farm population in particular, is aware of this trend. The general reaction to it is probably mixed but many express a deep concern inasmuch as there appears to them to be a continued drift toward rural depopulation and the elimination of the small-scale proprietorship of agricultural holdings. Public opinion on the issue is based upon a mixture of fact, emotion and a lack of adequate information. In reality however, the evidence suggests strongly that there has been, during the past few years, a continual improvement in the position of the family farm in North Dakota through these expanded operations. Only a relatively small increase has occurred in the numbers of larger-than-family units. Agriculture, like other industries, has been adjusting itself to the technical revolution.[1]

The main concern about the trend toward larger and fewer farms stems from an American ideal—the family farm. In North Dakota this concern has gone so far as to result in a proposal that a progressive land tax be enacted by the State, to limit landholding. We have in North Dakota a law which discourages certain types of "corporation" farming through rigid time limits to corporate tenure. The objective of these and similar measures is to promote a rather definite pattern of agriculture—one dominated by farms relying mainly on family labor, the managerial decisions resting with the family head, and large enough to provide an adequate level of living through time.

The analysis of farm size trends which follows relates directly to North Dakota. This delimitation was considered necessary in order that a report could be made at this time on some special work being

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[1] Ninety-two percent of the seeding of small grains in North Dakota was done by tractor in 1946 compared with 53 percent in 1939. The acreage of small grains harvested by tractor machines increased from 65 percent in 1939 to 97 percent in 1946. (*Use of Tractor Power, Manual Power and Hand Methods in Crop Production*, BAE, USDA, July, 1948).

done there on this question. The findings however, apply to a greater or lesser degree to the Great Plains Region as a whole.

Of the several measures of farm size—acres per farm, labor input, capital valuation, etc., the first two—acres per farm and labor input were used. The choice of such measures, we all know, is often determined by the data available to the investigator. The present case is no exception. But we feel that, particularly in the case of Great Plains agriculture, the combination of these two factors may be quite useful.

TABLE 1. FARM ACREAGE TRENDS, NORTH DAKOTA, 1934–44*

Acres per farm	Quarters (approx.)	Proportion of farms 100 acres or larger†		
		1935	1940	1945
100–259	1	24.1	21.2	15.5
260–379	2	25.7	23.7	20.0
380–499	3	18.5	18.4	19.4
500–699	4	14.7	15.6	18.1
700–999	5–6	10.4	12.0	15.0
1,000 and over	7 or more	6.6	9.1	12.0
Total		100.0	100.0	100.0
No. of farms 100 A. or over		79,398	70,302	66,501

* U. S. Census of Agriculture.

† Farms of less than 100 acres were excluded since the quarter section is about the minimum unit which could be considered a *bona fide* farm in North Dakota. The 100 A. minimum is therefore a liberal interpretation.

That there have been significant changes in farm size in North Dakota is readily seen from Table 1. In 1935, one-half of the farms were either one or two-quarter section units. In the following decade this proportion decreased to 35.5 percent. The loss to these two groups was absorbed by units of four quarters or more. Only the three-quarter section farms retained their relative position, being one-fifth of the total.

The quarter section and the two quarter section farm does not adequately utilize the family labor resources in this area except where intensive enterprises such as beets, potatoes and livestock feeding constitute major sources of income. So far as both grain and range livestock farms are concerned modern equipment favors considerably larger operations. As a result of this pressure for adjustment farms of four quarters or more increased from 32 percent of the total in 1935 to 45 percent in 1945.

We are currently in the midst of research designed to discover the real meanings of these trends in North Dakota—of this process of expansion and adjustment that modern farm equipment demands. Members of county PMA offices (and the County Agent where possible) were brought together in each county to discuss the position of the family farm. One objective of these interviews was to obtain estimates of the upper acreage limits to *effective* operation of the family farm for the main types of farming in each county.[2] Estimates for the range livestock type varied so widely as to possess no practical meaning, but estimates for the other three main types were fairly uniform. The number of quarters of land which could be effectively handled by the prescribed labor force were estimated to be as follows:

Type	*No. of Quarters*
Grain-livestock feeding	4
Grain	6
Grain-range livestock	10

Accepting these estimates as reasonably accurate we may conclude that farms varying in size between one and two sections could fall within the limits of effective family operations. The changes shown in Table 1 therefore may be looked upon as adjustments compatible with our over-all goal with one exception. Farms of 1,000 acres or more may in many cases exceed the family farm objective.

This group has increased from 6.6 percent of the total in 1935 to 12 percent in 1945. Many are of the range livestock type requiring large land areas for effective family operations and may therefore be family farms. The fact should not be overlooked, however, that for this Census group the proportion almost doubled during the period under review (Table 1). The Census provides little information regarding the farming operations of this group, and yet it is precisely here that the farm size controversy becomes acute in North Dakota.

The 1947 data referred to above are helpful here. Each farm of 1,000 acres or more was listed with its cropped acreage. Almost one-half of the farms in this group fall within the range of 1,000 to 1,280 acres. In this sub-group cultivation usually exceeds fifty percent

[2] The suggested standard for a family labor force included the operator, a mature son and limited amounts of seasonal labor. Such a maximum permits the use of father-son agreements in the transfer of the farm from one generation to the next.

of the land area, but the total labor involved can be met by our family definition in most cases. A little more than one-third were 1,500 acres or larger, and here the cultivation is generally less than fifty percent. Here it is more difficult to estimate the required labor force. Nevertheless, recognizing the limitations of these measures of farm size, it appears reasonable to estimate that about one-half of those farms having 1,000 acres or more probably meet the family farm criteria. In other words, about 6 or 7 percent of all North Dakota farms are larger than family farm units.

Looking Ahead

Not only is the number of larger-than-family farms comparatively small but the trends shown in Table 1 virtually stopped at 1945 levels for farms of all sizes. The county records for 1947 operations indicate *the same farm size distribution as does the 1945 Census.* For a variety of reasons expansion has not been maintained during the last three years. Time permits, on this point, but a few comments derived from interviews with 375 large-scale operators.

When asked what factors had made it *desirable* for them to expand operations, the most frequent reply was that, under favorable price and weather conditions, they had been able to buy additional land to utilize family labor and machinery more fully. Land was added to increase the efficiency of available labor and machinery. What made this *possible*? The two most frequent replies were: "good crops and prices," and "reasonable land terms."

The large majority of these operators *do not contemplate further expansion.* They find their greatest difficulties now in obtaining the required machinery and dependable labor. They no longer enjoy the favorable cost-price ratios of the early forties, family labor is being fully utilized and agriculture, as all other industries, faces the same problems on the national labor market.

We are in no position to predict the duration of the farm-size stability of the 1945–47 period. It does appear however that the modal farm unit (the family farm)—has significantly strengthened its position—that recent trends toward larger farms within the family farm range are, in the main, in the best interests of a prosperous agriculture. Advocates of a strong rural social base must in the long-run include the prerequisite that the production unit be large enough to sustain satisfactory living standards.

SHOULD ALL FARMS BE LARGE?*

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FARMING has long been considered a family-sized operation, whereas urban businesses have been thought of as large scale operations. It may surprise some that we now have 3.8 million urban businesses, or one business for about every 38 persons in this country. By the way of comparison, we have one farm, as classified in the Census, for about every 25 persons. Nearly one-half the urban businesses are family affairs, having no paid employees, and probably another 30 percent employ not over three or four paid workers. In agriculture at least three-fourths of the farms can be classified as family farms, and so there is less difference in the usual supply of most farms and urban businesses than commonly supposed.

Much can be read about the increase in the average acreage of farms and the predicted disappearance of the family farm. What are the facts in the case? Again referring to Census data, we find that the average size of farms in the three Lake States, Michigan, Wisconsin, and Minnesota, increased 10 acres from 1940 to 1945, now being nearly 140 acres. Incidentally the number of hired workers at the beginning of 1945 was less than half the number reported ten years earlier, while the number of family workers decreased less than 10 percent. Apparently the family farm is not disappearing in these states.

But to get back to the change in size of farms, let's see what sizes are increasing and decreasing in number. From 1940 to 1945 the total number of farms in the Lake States decreased 5 percent. Farms under 10 acres in size decreased 6 percent in number, those from 10 to 49 acres, 14 percent and those from 50 to 99 acres, 15 percent, while the number of farms in the 100 to 179 acre size decreased 4 percent in the three states. Decreases were shown in all of these sizes in all three states, except in those under 10 acres in Minnesota, where there was a small increase. On the other hand, the number of farms 180 to 259 acres in size increased 10 percent, while those of 260 to 379 acres increased 16 percent, those of 380 to 499 acres 15 percent, and the number 500 acres and over, increased from

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

6,242 to 7,661 or 23 percent. Evidently there are at least as many family farms now as before, but they are larger.

What is causing this decrease in the number of farms of less than 180 acres in the Lake States, and an increase in the percentage above that size? Probably there is no one force stronger than mechanization of farm work that is causing the shift in size of farms. The number of farms having tractors in these states increased over 40 percent from 1940 to 1945, and the numbers of tractors increased over 50 percent. The value of farm machinery increased 65 percent in that five year period. Most new machines, until recently at least, required a larger acreage than many farmers were operating for efficient use; thus they rented or bought more land. In a study of land purchasers in six counties in Michigan in recent years it has been found that two-thirds of the farmer buyers were owners increasing the size of their farms, while only one-third were tenants becoming owners. Recent developments of smaller and less expensive farm machines may lessen the force of mechanization toward larger farms.

There probably are many other factors causing changes in the size of farms, but suppose we see how reasonably large farms compare with relatively small farms. The large farms in the Farm Business Analysis Project during 1945–47 in four type of farming areas in southern Michigan in which over 400 farmers cooperated, averaged nearly 300 acres in size. The smallest farms, approximately one-third of the group, averaged about 120 acres. The large farms had proportionally less livestock and had just double the man work units of the small farms, even though they were $2\frac{1}{2}$ times the acreage. They were about 15 percent less intensively operated. Building investment per acre on the large farms was 20 percent less than on the small. The machinery investment per acre was 25 percent less. Labor efficiency on the larger farms was about a fifth higher than on the small farms. In spite of these efficiencies, however, the total expenses, exclusive of the operator's labor, for each $100 of income averaged the same on the small farms as on the large ($61). But when the operator's labor charge is included, the farmers on the larger farms were 15 percent more efficient. Net returns per farm to the farmer for his labor and management averaged $2,395 on the small farms and $5,290 on the large in the four areas during 1945–47. Many farmers with small acreages, however, do a much larger volume of business than usual, and through good

management make a labor income much beyond what would be expected from the acreage operated.

In view of the apparent trend toward larger farms, and developments along mechanical and technological lines, is there a place for the small farm, or are all the advantages in favor of the large farm? Like the Michigan comparison just cited many other farm management studies show that large farm businesses, when well managed, are more efficient and yield a higher return to the farmer, especially when farm prices are rising, or are relatively high, but that the net returns on such farms frequently drop more sharply than on small farms when prices decline. In other words, earnings on large farms fluctuate more widely than on small. Certain it is that a large farm business under normal prices provides greater opportunities for those with managing ability and who are relatively young with a strong desire to make financial progress.

It is equally obvious that large farms with the greater capital needs are more difficult for a young farmer to finance when he is starting, unless he becomes a partner with his father. Likewise, it is clear that a small farm better suits some who are near retirement age and want to take life easier, or who may not need high farm earnings, or who would rather take a lower but more stable earning with more time for living. Any college professor who has said he could make more money in commercial work, but remains a professor because he likes it better, can't very well criticize a farmer for operating a small farm because he likes it better. We should think of farmers as diverse individuals placing different values upon the various compensations in farming and not just as money making machines. Thus there are needs for both large and small farms.

The question can well be raised, are we as farm management men doing as well promoting sound management and full use of practices which would increase production efficiency on small farms as we are encouraging farmers to operate larger farms? We should lay more stress on some of the newer developments in farming which the small farmer can take advantage of at low cost or which would reduce his costs. Instead of purchasing the large machine perhaps he can hire the job done, or buy the smaller less expensive machine now being developed, which is better suited to his acreage. Perhaps the small dairy farmer can cut costs with artificial insemination, and raising only his best heifers. Maybe some labor saving techniques or thriftiness in other ways would make the work easier and increase net

returns. Many farmers on the smaller acreages could do a better job of the selection of plant varieties, disease control, and the like.

From the standpoint of improving operating efficiency, net farm returns, and the standard of living of farmers, farm management men have been on sound ground in encouraging larger farms for those with the ability and desire to operate such farms, but let us recognize that some people may not have the needed ability or may prefer a small farm and do all we can to help them make financial and non-monetary returns as satisfying as possible.

SIZE OF FARM IN THE NORTHEAST*

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THIS paper discusses trends and developments in size of farm in the 12 Northeastern States (New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia). The region contains a wide variety of types of farming of which dairying is the most important.

The acreage of land in farms in the 12 states decreased 26 percent from 1880 to 1945. The average acreage per farm declined from 104 to 97. However, in three states (Maine, Vermont, and New York) the acreage per farm increased somewhat.

This change in the acreage per farm is the composite result of a number of different trends. The number of farms of less than 10 acres increased 90 percent, while the numbers of all other sizes decreased (Table 1). The increased number of small-acreage farms is largely a matter of rural residences and part-time farms, although some poultry, vegetable, and greenhouse farms are included. In

TABLE 1. SIZE OF FARM IN THE NORTHEAST*

Size of Farm in Acres	Number of Farms		Percent Change from 1880 to 1945
	1880	1945	
Less than 10	48,308	91,672	+90
10– 49	201,293	167,462	−17
50– 99	227,436	147,818	−35
100–499	321,942	231,120	−28
500–999	7,205	6,673	− 7
1,000 or more	1,895	1,214	−36
Total	808,079	645,959	−20

* Basic data from the U. S. Census. The states included are New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, West Virginia.

recent years, the census enumeration of these small-acreage farms has been incomplete, so that the increase in numbers is understated in the figures given here.

* A paper presented at a roundtable at the annual meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

The most important decrease in number of farms has taken place in the 50–99 acre group. Many of these farms have been combined into larger units.

Acreage has been used as a measure of size in this discussion because it is the only measure for which complete information is available. In the Northeast, it is a poor measure of size. There has been a tendency in all of the better areas to intensify the agriculture and do more business per acre. For example, in one area in Northwestern New York, the average acreage of the full-time farms increased 28 per cent from 1908 to 1938, while the total amount of business in terms of work units per farm increased 45 percent.

The bulk of the agricultural production of the Northeast is becoming concentrated in the hands of a smaller proportion of the total number of farmers. A summary of data from the Sample Census of Agriculture indicates that 9,836 farms in New York had 30 or more cows in 1944. These farms were only 9.4 percent of the total number of farms producing milk, but produced one-third of all the milk in the state. In 1946, there were 319 farms in New York which had 100 or more acres in potatoes. These farms had 30 percent of the state's potato acreage and 2 percent of the United States acreage.

This concentration of the agriculture in the hands of fewer farmers does not mean that large-scale farm organization has taken over in the Northeast. Very few dairy farms are larger than a 3-man business. With efficient organization, three men can handle a 60-cow dairy and grow the accompanying crops.

In the fruit and vegetable areas there has been some increase in large-scale operations. Even in these areas, the most common farm organization is one where a labor force of one to three men handles the work during most of the year. A much larger labor force is needed in harvest. Thus, these farms have a family type of labor situation during most of the year, but a large-scale labor organization at harvest. The concentration of fruits and vegetables in a few well adapted areas has brought the migrant labor problem to the Northeast.

To sum up, the trends in size of farm in the Northeast are as follows:

1. A rapid expansion in the number of rural residences, where farm operations are conducted primarily for home use and amusement.

2. A tendency towards an increased acreage per farm on the full-time farms.
3. More intensive use of the best land, making more business per acre.
4. An increased use of migrant seasonal labor in the specialized fruit and vegetable areas.
5. A concentration of farm production in the hands of a smaller proportion of the total number of farmers, but no general trend away from the family type of farm organization. This concentration of production with its resulting increase in efficiency leads to a better standard of rural living and cheaper food for the cities.

SIZE OF FARMS*

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THE size of farm in Missouri and surrounding states is more meaningful if analyzed by type of farming regions. The three which predominate in this area are the Corn Belt Transition Region, The Corn Belt, and the General Farming Region. Census reports have served as the major source of data with sample counties selected in each region.

The average size of farm in the western area of the Corn Belt Transition Region is over 400 acres. In the southern area of this same region, which covers most of Missouri north of the Missouri River, it is 180 acres. In the Corn Belt the average size is the quarter section. In the General Farming Region in the southern part of Missouri and adjoining states it is 130 acres. Within this latter area the average size of farm tends to decrease from 185 acres in eastern Kansas to 100 acres in north-western Kentucky.

The difference in size of farm based upon average investment is almost as great as the difference in number of acres. The average total farm investment in the Corn Belt is $25,000. In the western part of the Corn Belt Transition Region it is $15,000, in the southern area $10,700 and in the General Farming Region it is only $6,220. In this latter region the most common size of farm is 80 acres with an average investment of $3,300.

In expressing size of farm in terms of gross income, the modal income size has been used. The modal income in the Corn Belt was from $6,000 to $9,999. In the western part of the Corn Belt Transition Region it was $2,500 to $3,999. In both the southern part of this region and in the General Farming Region the most common income was from $1,500 to $2,400. In some local areas in this latter region, however, it was as low as $600 to $999.

In analyzing the changes in size of farm, only two measures have been used, namely acreage and gross income. The number of farms from 20 to 49 acres in size increased during the depression years but have been decreasing since then. From the standpoint of agricul-

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* A paper presented at the annual meeting of the American Farm Economics Association, Green Lake, Wisconsin, September 15, 1948.

tural production, this group has little significance and many are farms by census definition only.

The general trend in the proportion of farms in the 50 to 99 and 100 to 174 acre groups has been downward. The decrease since 1930 has been as large as 40 percent in the western area of the Corn Belt Transition Region. Within the General Farming Region where the proportion of smal farms is greater, the decrease has been the least.

The proportion of farms in the 175 to 259 acre group has remained about the same. The number in the 260 to 499 acre group has increased by about 25 percent since 1920. The number of farms in the 500 to 999 acre group has increased over 75 percent and those over 1,000 acres, except in the General Farming Region, have more than doubled. The proportion of farms falling in these latter two size groups is still relatively small.

In analyzing changes in size of farm in terms of gross income three classes were used. (See following table.) In the General Farming

DISTRIBUTION OF FARMS BY SIZE MEASURED IN TERMS OF GROSS INCOME 1930 to 1945*

Gross Income Class		Corn Belt Transition Regions	Corn Belt Region	General Farming Region
		(*percent*)	(*percent*)	(*percent*)
Inadequate Farms	1930	54	35	78
($400–$1500)	1940	62	39	78
	1945	47	29	76
Family Farms	1930	44	62	21
($1500–$10,000)	1940	37	59	21
	1945	51	68	23
Larger Than	1930	2	3	1
Family Farms	1940	1	2	1
(over $10,000)	1945	2	3	1

* All values adjusted to 1939 price level.

Region a relatively high proportion of farms were inadequate. From 1930 to 1945 there was little movement from the inadequate to the family farm. In the Corn Belt Transition Region there was a reduction of about 7 percent in the number of inadequate units with a corresponding increase in the number of family farms from 1930 to 1945. The gain in Family Farms in the corn Belt was 6 percent and the proportion of farms in this class was relatively high.

Both acreage and income data indicate little or no significant

trend in the direction of farms that may be considered large or larger than family size. In analyzing the trends it is evident that some progress has been made in the reduction of the number of small or inadequate farms and a corresponding increase in the number of family size farms. More progress, however, has been made in the better farming areas where the problem of inadequate units is less acute than in the Ozark hill area and other parts of the General Farming Region.

ROUNDTABLE ON RISK AND FINANCE

Chairman: F. F. Hill, Cornell University

RISKS IN AGRICULTURAL LENDING[1]

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IN ANY discussion of risk in agricultural credit, it is necessary first to distinguish between risk to lenders and risk to borrowers. The thoughts in this paper will be confined largely to lenders' risks. The scope will be narrowed still further to a consideration of the means of protecting lenders against risk. For purposes of this paper these methods have been divided into four groups as follows: 1. Knowledge and judgment of the lender; 2. Loan policy; 3. General programs to improve and stabilize farm income; and 4. Pooling of risks. There is no pretense, of course, that full consideration can be given to these topics in a paper of this length. At best, it will be practicable only to outline some of the more pertinent problems.

Informed Judgment

Probably the most fundamental safeguard is for the lender to have full information about the man, his farm, and his operation, and then to know how to evaluate that information. As to the man, this includes his past performance in business contracts, his financial position, and his moral character. This point may seem very elementary but there are, nevertheless, some related problems on which further research would be helpful. In long-term lending, for example how can the lender in his loan commitment safely recognize the greater debt repayment capacity of the above-average operator? The general theory is to base the loan on the probable capacity of the average operator since the high-grade man may become incapacitated or die or sell and be succeeded by a poorer operator. Some questions are: (1) What are the odds the good man will be on the job until the loan is reduced to a safe average level? (2) How dependable is the assumption that good men gravitate to good land

[1] A paper presented at the annual meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

[2] The author is solely responsible for this paper and no parts thereof should be construed as necessarily representing official views or policies of the Farm Credit Administration.

and *vice versa*? (3) Is it practicable to protect against the death hazard by requiring assignment of life insurance until the loan is reduced by some specified amount? (4) To what extent can the risk be further reduced by effective father-son arrangements in order to assure a satisfactory succession in the event of death?

The last question suggests another. Several studies show that farmers generally make their highest earnings before the age of 40 and that thereafter farm income declines with increasing age.[3] How much of a risk factor is this with loans for either short and long terms? Is it practicable to take account of this factor in day-to-day loan operations?

Included in this first category of risk protection procedures is the necessity of knowing the farm, its physical productive capacity, and the probable dollar expense and income. This requirement opens up a vast field of exploration into methods of improving the estimates of the income and value of individual farms, and budgeting the loan program to these estimates. This includes the problem of forecasting prices and costs both for the short-run and for the longer-term loans. The latter aspect of the problem may be illustrated by just one question: If you were risking your own money in making 25-year farm mortage loans, what prices of hogs, beef, dairy products, wheat, etc., would you use now in estimating long-run repayment capacity of your borrowers?

An accurate appraisal must be made of the physical capacity of the farm itself. Progress is being made in evaluating the productivity of various soils. Methods of classification are being used to reduce the error in estimating productivity. The constant improvement of varieties and tillage practices, mechanization, erosion on the one hand and conservation on the other, increasing use of fertilizers, and all other technological developments are complicating factors. This is an important field for research and about which the lender needs to keep a steady flow of information in order to measure loan risks adequately.

The large institutional lenders are in a position to have men specialize in certain areas or in certain lending functions and thus build up the necessary "know-how" on such problems. Some carry

[3] See, for example, "Age of Farm Operators," *Farm Economics*, Cornell University, October 1945; *Relation of Variations in the Human Factor to Financial Returns in Farming*, Minnesota Agricultural Experiment Station Bulletin 288, June 1932; and *The Human Factor in the Management of Indiana Farms*, Indiana Agricultural Experiment Station Bulletin 369, August 1932.

on research to improve the procedures and knowledge. Small lenders unable to specialize or conduct research, howeve have anr, opportunity in some areas to employ such specialized knowledge for a fee. In many agricultural communities appraisal services are available and, when competent, the risk on farm mortage loans may be reduced when based upon such appraisal. It has been proposed that the availability of such service be broadened by establishing a public appraisal system.[4] While some advocates of this proposal have emphasized its value in connection with farm purchases, it would also represent one way by which small lenders could reduce risk through purchase of "informed judgment" in making loans.

Information and judgment usually cost money. The lender must decide how much information is needed, in what ways it may be obtained, and the costs of each method in relation to the value of the information in reducing risk. The answers to such questions will depend partly on the size of the lending business and partly on business policy.

Loan Policy

A second general method of risk protection is by adjustemnt of loan policy. One of the more obvious ways by which loan policy can be controlled to influence risk is in the amount loaned. The relative amount or size of the loan can be measured by comparing it with the value of the collateral or with the farmer's net income. The relation of risk to size of loan can be studied best when there are available data covering a large number of loans over a long period of years and on similar farms. The following data covering the loss experience with 450 Federal land bank loans closed from 1917 to 1932, inclusive, in a uniform area in southern Idaho illustrate the possibilities in the field of farm mortgage credit:

Loan per cultivated acre	*Number of loans*	*Loss per $100 loaned*
Less than $50	66	$0.15
50–69	148	.85
70–89	179	2.64
90 or more	57	5.95

[4] Three of the major farm organizations, namely, the American Farm Bureau Federation, the National Grange, and the National Council of Farmer Cooperatives have endorsed the establishment of a public appraisal service in connection with other agricultural credit legislation. The report on Postwar Agricultural Policy, issued by the Committee on Postwar Agricultural Policy of the Association of Land Grant Colleges and Universities, in October 1944, and the proposals made here at Green Lake a year ago by the committee reporting on The Federally Sponsored Credit Services to American Agriculture included similar recommendations. *Proceedings*, November 1947, pp. 1485–87.

It is not difficult to visualize how such results will help to adjust loan policy to the particular amount of risk which the lender wishes and is able to assume, provided, of course, that proper allowance is made for any changes in farmers' ability to earn net income and repay loan obligation which may have taken place after the period covered by the loan experience. If the experience occurred when the type of farming were built around cotton, for example, and the prevailing type is now dairying, the previous experience might not apply. Permanent changes in price levels or costs likewise would affect the interpretation of past experience. In addition to such voluntary adjustments, the loan policy of lenders subject to State or Federal supervision generally is limited in various ways by law and regulation, usually for the purpose of reducing the risk.

Risk may be further controlled by a policy in selection of loan areas. Some lenders, particularly insurance companies, attempt to limit risk by concentrating their loan activities in areas which are recognized as relatively safe. Farm mortgage lenders generally avoid areas subject to frequent overflow or similar hazards. Some refuse to make loans in irrigation districts where stable and adequate earning capacity has not yet been demonstrated.

The farm ownership loans of the Farmers Home Adminsitration illustrate two other aspects of loan policy designed to reduce risk. These are supervision and careful selection of borrowers. These policies are intended to offset the greater risk that would normally be associated with still a third policy, namely, lending a relatively large percentage of the purchase price of the farm. Other aspects of loan policy which can influence risk are the interest rate, rate of repayment, and method of repayment.

This second group of methods of protecting against risk, like the first, contains many fields of fruitful investigation. The matter of relative risk of various ratios of amounts of loan to some standardized appraisal is only one of the more obvious subjects of study. Another that would have considerable value to both public and private lenders is the rate of risk reduction that may be anticipated for various amounts and types of supervision. Measurement of geographic variations in risk likewise should be of considerable value to lenders in a position to select their loan areas.

Stabilization of Income

A third group of devices which reduce risk consists of various programs, both public and private, which have the effect of main-

taining and stabilizing farm income. These include the price support program of the Federal Government, crop insurance, educational and research activities, all efforts both Governmental and otherwise to establish conservation practices on farms, and any other programs which eventually may have beneficial effects upon farm income.

In addition to those which have just been mentioned, there is another set of devices which should be mentioned and which appear to fit better under this category than any of the other three. These include the requirements by the lender that the borrower maintain adequate fire and hail insurance. It would likewise include title insurance if and when carried by the lender. As has been mentioned, life insurance also is used sometimes in connection with loans as a protection to both the lender and the borrower.

The stabilizing effect upon farm income of these and other similar programs is particularly significant since one of the most important causes of risk in farm credit is fluctuations of the income from which loan repayments may be made. The risk in making a loan can be reduced if the lender needs to be concerned only about estimating the level of the income and does not have to take into account the possibility that the income may vary widely from year to year. The relationship between variability of income and risk, therefore, offers a promising field of study.

Pooling

The fourth category of risk protection arrangements, outlined at the beginning of this paper, is pooling. This is simply the advantage of being able to have a large enough volume of loans distributed over sufficiently diverse conditions to minimize the possibility that any single disaster will affect any large share of the total portfolio. When risks are spread over a large volume of diverse farming operations, the losses from the accidents and mistakes which inevitably occur are not likely to loom very large in the total.

Small local pools may have the advantage of closer acquaintance and contact with the borrower but they lack the volume and greater diversity available in regional or national pools. In operations conducted over a single county or perhaps a few adjoining counties the loans are likely to represent only one major type of farming and one common set of weather, soil, and other conditions. Drouths,

disease, price declines, loss of markets, and similar disasters are likely to affect the entire loan area.

The limited size of the risk base is an element of weakness in the structure of the production credit associations, national farm loan associations, country banks, and similar institutional lenders. The eight PCA's which have become insolvent (all prior to 1939) served areas having one major product such as apples, potatoes, or truck crops. The number of NFLA's which sustained capital impairment during the depression undoubtedly was increased because of their inability to spread their risks over more than one or several counties. In the case of both systems, an effort is being made to build protection against such risks by improved loan policies and adequate reserves and net worth. The PCA's, in a sense, have been able to spread some of the risk through the capital stock subscribed by the production credit corporations. In 11 districts the NFLA's have entered into agreements with the Federal land banks to share losses on a 50-50 basis. This arrangement spreads half of the losses over bases equivalent to several States.

In the case of commercial banks, the small risk base is probably more serious for non-member than member banks. Inadequate rediscounting opportunities during periods of strain make non-member banks more vulnerable to forced loan liquidations. This possibility is of most importance in such States as Iowa and Wisconsin where non-member banks held over 50 percent of the non-real estate agricultural loans of the principal lenders on June 30, 1947. There were 13 States in which non-member banks held a third or more of such loans. The ability of member banks to rediscount with the Federal Reserve banks, of course, does not protect them against losses but it does increase the likelihood that if a local disaster comes, a bank can avoid forced liquidation which tends to result in losses.

Loan Insurance

The method of spreading risks of smaller lenders proposed most frequently is some form of insurance against loan losses. A year ago the committee reporting here at Green Lake on Federally sponsored credit services to American agriculture suggested such a program for the credit institutions which were proposed.[5] Suggestions also have been made that a Nation-wide system of insurance for farm

[5] *Proceedings*, November 1947, pp. 1472–78.

mortgages be established for all institutional lenders similar to the facilities now available in the urban home mortgage field through the Federal Housing Administration. A limited form of insurance is already in operation by the Farmers Home Administration.

It will be possible to mention only a few of the many problems involved in considering a loan insurance program for agriculture. One of the first may be the premium rates that would be required. It might appear that since the institutions in the FCA have been in operation from 15 to 31 years, their body of experience should provide a very good basis for determining premiums. Unfortunately the experience of each group of institutions has been affected by special circumstances to such an extent that the data would have to be mixed with a great deal of judgment in using them as guides for this purpose.

For several systems the limiting fact is that except for relatively short periods the institutions have operated only on a rising price level. This is true of the banks for cooperatives and the production credit associations, for example. The banks for cooperatives organized in 1933 had closed up to June 30, 1948, $3,235,000,000 in loans, including renewals. The losses actually sustained plus the valuation reserves for losses on loans in force amount to about one-eighth of one percent of the amount loaned. The production credit associations have made cash advances (excluding renewals) of $4,515,000,000. Including valuation reserves, their losses amounted to only one-tenth of one percent.

For both systems these are very small rates of loss. The question is, however, if one were setting up premium rates for Nation-wide insurance, what adjustments should be made for the fact that during the next 15 years the price trend may be in the opposite direction from that prevailing during the past 15 years?

The Federal intermediate credit bank system has been in operation for a longer time—25 years. During this quarter century, which has included both falling and rising prices, the rate of loss on over 12 billion dollars of loans and discounts (including renewals) amounted to only one-fourteenth of one percent. This experience would not serve as a guide, however, for primary lenders such as country banks or production credit associations since the intermediate credit banks are principally wholesalers rather than retailers of credit and sustain losses only when the resources of the endorsing institution are inadequate to meet the obligation.

In the long-term field the Federal land banks have been in operation 31 years. As of June 30, 1946, the accumulated Federal land bank losses including valuation reserves for losses, when expressed as an average annual rate on loans outstanding from 1917 to that date, amounted to .50 percent. If Land Bank Commissioner loans and related losses are included, the average annual rate is raised to .62 percent. This experience, however, covers a variety of appraisal and loan policies and other factors which would have to be interpreted before the results could be used as a guide in determining insurance premium rates. For example, appraisals for the early loans were based on current market values. From 1933 to date, appraisals reflect normal agricultural values. Prior to July 1, 1945, land bank loans were limited to 50 percent of the value of the land and 20 percent of the insured permanent improvements. Since that date they have been limited to 65 percent of the total normal agricultural value of the farm. To the extent that Commissioner loan experience would be considered, it should be recognized that such loans were on the books during a period when the trend of farm commodity prices was almost continuously upward. There were wide geographic differences also in the loss rates.

If and when any insurance program were being constructed, the experience of the FCA units certainly would throw valuable light on the problem of establishing premiums. It is also clear, however, that there would need to be considerable supplementary analysis and judgment, taking into account credit policies and other conditions that would affect the loan experience.

A second question that comes up in connection with loan insurance is the problem of maintaining an adequate incentive for the local lender so that the burden of guarding against unsound loans will not be placed wholly upon the insuring institution. This would be a particularly important aspect in any discussion of Nationwide insurance programs within the FCA. The pattern in that system has been to build strong local cooperatives and to attempt to encourage the local units, that is, the national farm loan associations and the production credit associations, to take increasing responsibility in closing and servicing loans. It has been felt that if all loans closed were insured fully against losses the local officers and directors might lose interest in this responsibility and a principal advantage of the cooperative form of organization might be lost.

Other questions in connection with loan insurance are who would

pay the premiums, the lenders or the borrowers, and who would be benefited? The incidence of the premium would be determined largely by the competitive situation. If most lenders eventually came into the insurance plan, however, the interest rate on insured loans probably would tend to dominate the market, and borrowers then would be paying most or all of the cost of carrying the insurance.

In the event the incidence of the premium rate should be on the borrowers, their credit costs would rise, but the facts suggest that there would be little or no compensating improvement in agricultural credit service. In view of the conditions existing in the urban home mortgage field in 1934 when it was organized, there seems little doubt but that the insured loan program of the Federal Housing Administration increased the availability of credit and improved the credit service in other respects. In agriculture, however, credit services already have been developed and improved through other means to a point where, from the borrowers' standpoint, they are equal to what is available in the urban field. There is not now the same opportunity, therefore, for improvement in agricultural credit service as existed in the urban field when the Federal Housing insurance program was established. In at least one respect, moreover, the farm mortgage credit service is better than in the urban field. In the insured urban system, there is no plan for forbearance or leniency in the event the borrower is in temporary distress. On the contrary, the rules favor prompt foreclosure by the lender. The Federal land bank system has a well-developed and tested forbearance policy. Since the system is owned by the borrowers, it provides a better chance of fair treatment in times of emergency. Equal consideration should be available to borrowers from the Farmers Home Administration.

In the short-term field, there is, of course, no insured loan program for urban borrowers with which comparison can be made. Improvements have been made in short-term agricultural credit service, however, to a point where borrowers would have very little to gain through adding over-all loan insurance. At the same time, it must be admitted that the PCA system and probably also the banks for cooperatives would be strengthened if some way could be evolved to spread the risks on a Nation-wide basis without losing local initiative and incentive. This might not need to add to the

present interest rate but might be effected by diverting part of the local reserves to a national reserve.

While the advantage to borrowers would be very doubtful, there is probably little question that lender would receive some benefit from an insured loan program since it would provide another outlet for investiment funds with an assured return. Whenever a lender chose to participate in making insured loans, however, some flexibility in operations would be sacrificed.

These brief comments on loan insurance suggest that in the event any Nation-wide, over-all plan for agricultural credit should be considered there are many problems that will require careful study. The first questions should be: In view of present credit facilities, is it really needed? Will credit service be improved? Who will pay the premiums? The present evidence indicates a negative answer to the first two questions. If the answer should be in the affirmative, however, then there will be further questions such as: Should the insured lender assume some liability for loss? What premium rates will be required? Should there be separate pools and graduated premiums for different degrees of risk? Should the insurance plan be self-sustaining? To what extent, if any, should the Federal Government assume liability for insurance claims? Since the success of farm mortgage loan insurance will depend largely on an efficient appraisal system, should it be built around the present, seasoned Federal land bank appraisers or should a new, competing system be formed?

In this paper it has obviously been possible to do no more than touch on a few of the many interesting and practical problems in protecting lenders against risk. Possibly it will serve at least to assist in outlining the subject and to stimulate interest in studies in this field as they appear in the future.

DISCUSSION*

LAWRENCE A. JONES
National Bureau of Economic Research

Dr. Engberg has comprehensively outlined the various elements of risk facing farm lenders and has indicated methods of minimizing and sharing losses. He gives special attention to the pros and cons of loan insurance programs which at times have been proposed.

* A discussion at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

As a basis for examining an insurance program I would like to look at risks as being of two types. First is the risk that exists irrespective of area. This risk is closely related to chance; the usual chances that a borrower will turn out to be a bad manager, a poor moral risk, become sick or die; or the chances that there will be errors in judgment in properly appraising the variations in individual farm businesses that occur in an area. Although these risk factors are often accentuated in bad times, they tend to be uniform throughout the country.

The second type is the area risk. Varying degrees of risk from area to area result from wide differences in geographic characteristics; soil, topography, climate, type of farming, and economic peculiarities as relates to prices, markets, and off farm employment. I have in mind the various areas of farm-mortgage distress shown on a map being developed in connection with a study of the National Bureau of Economic Research. For the interwar period one of the areas of blackest experience covered practically all of the Great Plains. Another region of heavy foreclosures and losses was the eastern Cotton Belt centering in Georgia. In the Corn Belt, farm-mortgage distress was very acute in southern Iowa and northern Missouri. Other trouble spots included parts of the Lake States and sections of the central Cotton Belt, Mississippi, Arkansas, and Oklahoma. Distress was widespread in these areas, even for many of the more efficient operators on good farms.

Areas of relatively good farm loan experience which stand out sharply include southern New England, parts of central Corn Belt, western Texas, and a strip about 100 miles wide along the Pacific.

An accurate forecast of future loan losses as a result of this experience can not necessarily be made. As Dr. Engberg indicates, a great deal of sound judgment is needed to properly appraise the influence of various factors. Because of basic geographic characteristics, however, there is little doubt that some areas are high risk and others low risk. I believe most lenders recognize the high risk in sections of the Great Plains where average annual rainfall is under 20 inches, or parts of the Corn Belt where soil quality is poor and topography is rough, or in portions of the Old South where soil fertility has been depleted, dependency is on cotton, and boll weevil is prevalent. On the other hand, basically lower risks are recognized such as in the central Corn Belt where yields are high and dependable, and in the northeast with its relatively stable economic conditions.

In view of these two types of risks—those irrespective of area and those which are characteristic of an area—what can lenders do to minimize losses or their effects? Dr. Engberg has mentioned many of them: varying the loan ratio, adopting a strict selective program for both man and farm, or providing supervision of farm operations.

For a further analysis of the risk problem it is necessary to look at the type of lender: large-scale lenders such as the Federal land banks and insurance companies, and small-scale lenders such as commercial banks and individuals.

The "chance" risks which exist in all areas are quite adequately coped with by the large-scale lenders. Such risks are sufficiently spread so that

the need for an insurance or pooling program is small. For local lenders, on the other hand, who operate in a small area with few loans, insurance or pooling may well be desirable to effect the proper spreading of such risks.

With the second type of risk, where wide differences exist between areas, a nationwide insurance or pooling program would be a possible means of protecting lenders both large and small from the effects of localized losses.

In this connection one encounters many of the questions raised by Dr. Engberg—lender incentive, government support and liability, premium rates and area differentials. Such problems could probably be worked out in the development of a program. Notwithstanding, I agree that we should not be too hasty in this direction.

I wonder if the fundamental problem facing lenders with respect to different area risks is not one of *income*, or establishing a rate of interest high enough to cover all costs. If a better adjustment could be made between costs of doing business in an area and the rate of return, much of the need for a loan insurance program—for large lenders at least—might be eliminated. Time does not permit an analysis of the factors affecting interest rates such as cost of money, administration costs, customs, and competition. I would like to seriously question, however, whether the long time risk cost is reflected as much as it should be in the interest rate.

For the various farm mortgage lenders, rates tend to be uniform throughout the country. This tendency exists for insurance companies, commercial banks, and individual lenders, as well as for federally sponsored lenders. Current average interest rates on outstanding farm mortgage debt range only from 4.3 percent in the West North Central to 5.0 percent in the South Atlantic. In view of the widely differing risks, known to exist, a narrow range in interest rates throughout the United States hardly seems justified from the standpoint of each area paying the full cost of credit used.

I realize that lack of a precise measure of risks, practical administrative problems, and even political and social considerations are strong forces for maintaining a uniform rate. If, however, it is desirable that each broad area of high risk stand on its own feet and not be subsidized by low risk areas or the lender, I believe many of these problems could be overcome as our understanding of agriculture grows and improved lending practices develop.

DISCUSSION*

ELI FERGUSON
The Equitable Life Assurance Society of the United States

As usual Dr. Engberg has done a fine job. He has very ably outlined the various factors of risk in farm mortgage lending and has pointed out some which could well bear further study.

While I am most interested in all phases of research in connection with farm loans, my day to day work is in helping to administer a farm mort-

* A discussion given at the annual meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

gage business—deciding whether a certain loan should be made and if so for how much. My remarks, therefore, may reflect a little different viewpoint, but not greatly so, because I know Dr. Engberg is very close to the actual operation of the Farm Credit Administration.

When I read the title of our subject for discussion some weeks ago, I wondered if Dr. Engberg might not discuss a risk factor which surely is regarded as very important to the Federal Land Banks, to their many friends interested in seeing the continuation of a sound cooperative farm credit system, and especially to the borrowers presently owning stock in National Farm Loan Associations. I refer to the risk inherent in making long-term loans with funds that have been obtained by borrowing on a short term basis—lending money for 25 to 35 years that, according to present obligations, must be repaid or refinanced within five or six years. The Banks should be especially concerned since interest rates have been rising for several months and refinancing could not be done on anything like the low rates now enjoyed.

It is hardly conceivable to me that any substantial lender would continue to expose itself to such a risk for very long. The current heavy rate of payout, of course, is some protection, as well as the surplus funds of some of the Banks; but the only sensible way, in my opinion, to meet the problem is to avoid in the future having such large maturities in short term issues and to keep the interest rate on new loans in line with the money market. I have heard rumors that an increase in rates by the Federal Land Bank System is imminent. I think I can say with certainty that it need have no fears of its competition not following suit immediately. Insurance companies cannot continue a four percent interest rate much longer with sharply increasing costs of doing business and the heavy payout; furthermore, with alternative types of investments yielding a higher net return, money just will not continue to be available for farm mortgages. Interest rates have been at an artificially low level for several years and the effect on borrowers of a half percent increase will be negligible.

On rechecking the title which Dr. Hill assigned to us, however, I find that it is "Risk *and* Finance" rather than "Risks *of* Finance." Possibly then my remarks are out of order in this discussion, but we in the Equitable Society are much interested in the continuation of a sound, cooperative credit system owned and managed by its members. We take this position because we think the alternative is direct loans from the United States Treasury. No private lending organization could compete successfully with such credit because it would very likely not be conducted on a business basis. Such lending by the Federal Government is bound to cost the taxpayers a lot of money and would be a very significant further step toward Socialism. We think that if the Federal Land Bank System continues much longer exposing itself to the risk I have described, it will be doing so with the full expectation that the Federal Treasury will come to its rescue if it is found impossible to refinance its obligations at interest rates which will keep the system solvent. The Land Banks are now owned by the farmers. Would it not be better for them to manage their financial affairs with the foresight of a great public utility, railroad, or any other organization with long term commitments?

I believe that Dr. Engberg in his opening statement makes an unnecessary distinction between the risk to lenders and the risk to borrowers. We in the Equitable Society have always looked on the risks of farm mortgage lending as applying both to the borrower and the lender. In fact, the impact is even greater on the borrower because equities are always wiped out first. We try to make our loans so as to preserve those equities and I believe Dr. Engberg's organization also does. Our guiding principle is that the Equitable Society's objective in making farm loans is to help farmers buy farms of their own and eventually have them free and clear. By keeping that objective firmly in mind many policy decisions are made less difficult.

No doubt the greatest risk arises through one of the most common errors—lending too much money, especially on low grade farms. Considerable research has proved what every loan man knows, that most foreclosures and nearly all losses occur on the low grade farms.

The safest thing to do, of course, is just not lend on such farms. Many lenders try to follow that policy and think they are successful in avoiding such loans but the fact remains that they are making many hazardous loans on medium and low grade properties. Some folks are inclined to blame the appraisers for this weakness, citing as a common fault over-appraising low grade farms. I think appraisers are perhaps partly to blame, but the appraiser, in my opinion, should not be expected to do more than determine value based on the market. He is paid for his judgment of what the property would sell for under a given set of conditions. We define those conditions as including (1) a willing, but not forced seller, (2) a desirous, but not anxious purchaser who is experienced in the area and is buying for agricultural purposes, (3) climatic and seasonal conditions typical of the area, and (4) prescribed normal commodity price and cost of production conditions. If buyers meeting those qualifications have consistently under those conditions paid a certain price for a certain property or comparable properties, then that price, in my opinion, is the value. Without question such a price includes perquisites that will not pay any interest. A farm provides a place to live, a place to work, a place to exist, if you wish, and on a low grade farm those things bulk large in proportion to the total advantages of owning the farm. But they do not pay interest. It is clear, I think, that the debt-paying capacity of a poor farm is proportionately much smaller than the capacity of a good farm, and loans of equal percentage of the value of all classes of farms result in overlending on the poorer farms.

The only answer I believe is for the farm loan executive to see that the appraiser does a good job of appraising all classes of farms on the basis of values as determined in the market place. The loan executive can then vary the amount loaned depending on the classification of the farm. We do not hesitate to approve loans of 60% to 65% of the appraised value of top quality farms, but we cut these percentages down rather fast as the classification of the property is lowered. One cannot be inflexible in the matter, but as a working rule we try to limit our commitments to about 60% of the value of A farms, 55% of the value of B farms, 50% of the value of C farms and 40% of D farms. We do not make loans on low D and E farms if we know it. The alternative to this method is to devise a set of obscure

theories of value and appraisal and procedures which will fix the value at a figure, 65% of which is a sound loan. That may have advantages where the appraiser is the guardian of the loan committee. Personally, I much prefer the method we follow.

Many of you have seen the farm loan approaisal manual which we published last spring. This 64 page booklet is our instructions to salaried appraisers of the Equitable Society. We prin and made it available to the public in the hope that it will be used as a practical guide to farm appraising and as a supplemental text book by teachers of appraisal methods and farm finance. We believe that anything we can do to develop a broader understanding of appraisal problems and methods will reduce the risk to both the borrower and lender.

Dr. Engberg very properly lists personal habits and ability of the borrower as a most important risk factor and suggests that further research might be helpful in guiding lenders to recognize the repayment capacity of the above average applicant. He points out that the general theory is to base the loan on the capacity of the average operator since the high grade man may become incapacitated, die, sell or be succeeded by a poor operator.

The Equitable Society does not follow this general theory but does make heavier loans to the above-average risks than it would to the typical borrower and protects itself in one of two ways. The simpler and less effective way is to include an agreement in the mortgage to the effect that the borrower will reduce the loan to a specified figure in the event the property is sold, and that if the loan is not so reduced, we have the option of calling the loan. While we have used this method only about three years, it has enabled us to obtain the desired reduction on almost all loans where it was used. Of course, occasionally the new owner is just as capable as the old, in which event we sometimes waive the requirement.

Our second method of meeting the requirements of the above-average risk is to take a bankers' view of the excess portion of the loan and require it to be repaid in extra heavy instalments over the first year or two. In making such a requirement we examine carefully the applicant's financial statement and ability to pay.

There are several advantages to this latter procedure, most important being that if there is an undisclosed weakness in the borrower it will show up soon, and if the market value is presently high as compared with the appraisal we can require some action before the market goes down. Also, this enables us to administer our own mistakes rather than leave them for someone else to take care of several years hence.

We have made several thousand such loans and so far, with only one or two exceptions, all of those special payments have been collected or the property improved to a point where they were no longer necessary.

Dr. Engberg has touched on the many problems involved in establishing commodity price levels and cost relationships as a basis for appraisal. We are working on those problems all the time. At present we are using in our appraisals approximately the prices and cost levels in effect shortly before

the war, but as soon as prices have adjusted themselves to the post-war situation we shall have to develop new price levels and cost relationships based on the new conditions. There is a vast amount of work to be done when that time comes, especially in developing reliable cost of production figures for the various crops, types of farming and areas.

Several of the special features of loan plans currently available serve to reduce the risk to the borrower and the lender. Long term amortized loans which are paid in full at maturity and do not have to be renewed, eliminate the risk to the borrower of having to refinance on an unfavorable money market.

Special prepayment and reserve privileges also serve to reduce the risk to both parties. For example, the Equitable Society for many years now has included a provision in all of its notes permitting borrowers to pay off any amount at any time received from farm income. For several years now, one-fourth of the principal on our books at the beginning of the year was paid off during the year. This has cost a lot of earnings, but each year we have graduated a class of boosters for the Equitable, in considerable contrast to those who had their loans with companies which refused to accept prepayments from farm income.

About one-fourth of our borrowers have taken advantage of the Society's Prepayment Reserve Plan by which extra payments are held to meet interest and principal payments in lean years. These funds are held in reserve without interest, but we stop interest on an equal amount of the loan, so, in effect, the borrower earns interest on these reserve funds at the loan rate. Thus, we try to make it easy for an Equitable borrower to protect himself against the risks of crop failure, temporarily low prices and extra expenses through illness or other misfortune. The Federal Land Banks offer a similar service in their Future Payment Fund.

Another method of reducing risk to borrowers and lenders is considerate handling of delinquencies. Delinquencies are inherent in the farm mortgage business, and compared with other types of mortgages the delinquencies are always larger. This is partly true because farm mortgage maturities are once or twice a year instead of monthly. The amount of delinquency on an annual payment loan is twelve times the amount on a monthly payment loan. And if there is a crop failure, hailstorm or other misfortune it may be another full year before a payment can be made. In the meantime, the loan executive must have complete confidence in his judgment that the account will be brought in good standing in a reasonable time. This calls for a thorough understanding of the type of farming involved. We take the position that we have no business making farm loans on types of farming which we do not know enough about to administer defaults reasonably. Stated simply, we require borrowers to pay, if they are able to pay, even though payment may have to be made from some other sources than earnings from the farm. When they are unable to pay and there is a reasonable chance of them being able to pay later, the next year or the year following, we carry on with them, but when the situation becomes hopeless we believe further delay of transfer to other hands does no one any good.

Foreclosures are unpleasant matters to administer and that is one of the principal reasons why we exert every effort to reduce risks to a minimum and try to avoid making high loans.

The statistics would indicate that we have been very successful in our lending operation of the past 17 years because of all the new loans made since 1931, not a single one has resulted in acquired real estate and we have no loans in foreclosure now. We could perhaps feel proud of such a record and we could also be criticized for not taking enough risk. Some people say that if you don't foreclose some loans you are not lending enough on the others, and I would agree that is true under normal circumstances. But we feel that our record is not in the least way remarkable. Except for a brief hesitation in 1938 and 1939, all of these loans were made on a steadily rising price level. One should be able to make loans with his eyes shut and suffer no bad effects, if prices the next year are always higher.

We have analyzed much of our previous foreclosure experience on loans made prior to the depression and know about where the breaking point was in each locality where we operated, and keep those facts in mind as we approve loans. But as Dr. Engberg has pointed out we may have a different set of circumstances. The experience of those days may not be a good basis for judging the loans presently being made. I feel rather certain that we do not need to prepare for situations as bad as they were in 1931, 1932 and 1933. But the facts are that farm loans of the Equitable Society or, for that matter of any other lender, made in the last 17 years have not been tested, and the experience previous to that may not be applicable. We must, therefore, look largely to other fields for our guides. Our opinion is that the most important thing to watch now is the cost and price relationships developing and which seem likely to prevail in the various types of farming, various commodities and for the various areas.

Dr. Engberg has spoken at some length regarding the proposals for farm mortgage insurance and other pooling arrangements. I am perhaps not so conscious of a need for such arrangement because the farm mortgage business is a relatively small part of Equitable's investment activity, and bad experience in the Farm Mortgage Department would likely be more annoying than costly, in relation to the total investment. But in the same way that we shy away from one-crop farms because there is no diversity of risk, I can see that investors might shy away from strictly farm lending organizations because of a similar lack of diversity, especially if their loans are concentrated in a rather small area. If there is a real hazard there, I hope that the Farm Credit Administration works out a suitable solution and that it is not done by the underwriting of the risk by the Federal Government.

As far as the local country banks are concerned, there is little need for many of them to take advantage of any federally sponsored appraisal organization or farm mortgage insurance similar to the FHA. Other methods of meeting the problem if there is one can be developed. For example, the Equitable Society has devised a method which relieves local banks of the technical appraisal problem and also the risk inherent in tieing up large sums of money in rather slow moving farm mortgage paper. I refer

to the Approved Mortgage Plan which was originated and introduced by the Society a few years ago. By this plan banks originate the application, the farm is appraised by the Society's salaried appraiser, the title examined by the Society's attorney, the bank closes the loan and holds the investment for a two-year period, at which time it is assigned to the Society for the balance of the term. There are some special procedures followed to legalize the loan under the term limitations imposed by the National Banking Act and some of the State laws, and yet give the borrower a long term loan. After the loan is assigned to the Society, the bank continues to collect interest and principal payments and remit to the Society as its agent. More than a thousand banks over the country have entered into agreements with the Society on this plan and several million dollars of loans have been made. Many of the larger insurance companies have copied the plan.

Personally, I see no need whatever for a federally sponsored insurance program for farm mortgages. The term "insured loans" seems to have some magic about it that makes people think that the 85 to 90 percent loans so far successfully made on dwellings could be made just as successfully on farms if they were only "insured." There isn't anything about an insured loan that makes the interest easier to pay. In fact, the insurance feature is an added cost to the borrower. In my opinion, it would do farm borrowers no good whatever, and I believe that is Dr. Engberg's conclusion. As far as lenders are concerned, if they do not have the resources and know-how to make farm loans, I think they should stay out of the business, unless they choose to handle it on the basis of the Approved Mortgage Plan, or some similar arrangement that has hard money behind it. If an insurance program made credit more freely available to farmers, that perhaps is about the worst thing that could happen to them now. Credit is already too free, in my opinion.

We might examine for a minute just who would benefit by such a program and who wants it. I shall not name names, but if you will go back into the history on it you will find that it was originally sponsored by a group which has made a lot of money making FHA loans and selling them to investors. They visualize doing the same thing with farm mortgages. The result would be ownership of farm mortgage paper by widely dispersed uninformed lenders with little or no conception of the problems of administering defaults. As Dr. Engberg says, FHA insurance offers no protection to the borrower but, instead, puts a premium on prompt foreclosure. Some might say that the Farm Credit Administration or Farmers Home Administration could administer the defaulted loans and keep the investors happy by advancing the interest. In my opinion, that would be the beginning of the end for both private and truly cooperative farm credit in this country and a further decisive step toward social credit. I wish I could believe that we have heard the last of insured farm mortgages.

ROUNDTABLE ON FRUIT AND VEGETABLE MARKETING

Chairman: M. P. Rasmussen, Cornell University

NATIONAL CONSUMER PREFERENCE STUDY FOR POTATOES*

H. W. Bitting
Bureau of Agricultural Economics

THE national consumer preference study for potatoes sampled a universe of 23.7 million private households in cities of 2,500 and over in the United States.[1] In addition to giving national urban figures the sample was designed to give separate estimates for the South, the rest of the country excluding the South (called the "North" in the report), and three cities—Boston, Chicago, and Los Angeles. A total number of 3,306 interviews were taken. The interviewing was conducted during November and December of 1947.

It would seem logical to examine briefly certain considerations and the various phases of consumer research before reviewing the results of this study.

Coordination needed: Some degree of coordination in our consumer researches is desirable, so that each study may contribute to the others. Certain objectives can best be attained through the use of personal interviews, others by controlled retail store experiments, or by consumer panels, or by mail questionnaires, personal observation, etc. In most cases a combination of these methods or some of them, would be the most efficient way to drive toward the desired objectives. No one method is best for all purposes. Each can make a contribution to particular objectives.

Value to producers and consumers: Consumer research studies should assist in reflecting price differentials to growers for the goods

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* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

[1] The research on which this report is based was made possible by funds provided by the Agricultural Research and Marketing Act of 1946.

The Bureau of Agricultural Economics assumed major responsibility with cooperation and advice from the Bureau of Human Nutrition and Home Economics, Farm Credit Administration, Production and Marketing Administration, and representatives from the technical committees representing the Agricultural experiment stations in four regions.

and services consumers want most. Through them, and through adequate follow-up work and adjustments, producers would be afforded an opportunity to maximize their returns and consumers could be provided with the goods and qualities and services they want and can pay for.

Consumer research may be roughly divided into three categories: I. Studies of buying behavior under existing conditions based upon observation and historical data; II. Studies dealing with preferences, attitudes, and opinions; III. Studies designed to evaluate preferences under controlled experiments.

I. Buying behavior under existing conditions

These studies represent the usual type of consumer study where consumer buying behavior is observed under existing conditions and sales data are recorded. Such information is useful for purposes of forecasting sales. It can be combined with controlled experiment studies to provide a base from which to forecast possible sales when conditions resembling the controlled conditions prevail generally. The observation of buying behavior alone affords no assurance that consumers were given a chance to buy the goods and services they wanted most.

II. Preferences, attitudes and opinions

There is some information which can be obtained only by going directly to the consumer. Personal interview, mail questionnaire and consumer panel methods are designed to elicit information from consumers. They are particularly adapted to learning: (a) Reasons for non-use or limited use of a commodity, (b) the extent to which consumers are able to obtain the goods, qualities and services they want most in the form in which they want them, (c) the relationship between consumer preferences and the various factors which affect these preferences such as income, age, size of family, type of work, nationality, etc., and (d) probable preferences for new products in relation to competing products or preferences in regard to new grades or new packaging of an item.

It is essential that proper sampling methods be employed in obtaining consumer preferences. It is only through proper sampling that we can estimate errors and estimate the reliabliity of our results.

III. Controlled experiments

Stated preferences made by consumers may have limited influence on the market because the consumers may not be able or may not be willing to pay the price required. Therefore, controlled experiments are needed to evaluate consumers' stated preferences in terms of prices paid and quantities purchased.

Findings of the National Consumer Preference Study for Potatoes

The national consumer preference study for potatoes typifies consumer research described under Category II. One of the objectives of this study was to discover the variation in potato consumption with respect to geographical areas and income levels, as well as the factors associated with these variations.

It was found that consumers in the South had the lowest potato consumption. According to the responses given they consumed 2.0 pounds weekly per person exclusive of infants under 9 months, compared with 2.8 pounds for "the North," and 2.7 pounds for the U. S. average. Factors associated with lower potato consumption in the South include a higher percentage of homemakers reporting the use of rice, sweetpotatoes, grits, and corn meal mush.

TABLE 1. AVERAGE PER CAPITA CONSUMPTION OF POTATOES AND PROPORTION OF HOMEMAKERS THAT REPORTED THE USE OF SPECIFIED PRODUCTS AS SUBSTITUTES FOR POTATOES FOR SPECIFIED AREAS, NOVEMBER AND DECEMBER 1947

Areas and cities	Per capita consumption of potatoes for week prior to interview	Proportion of homemakers reporting the use of specified products as substitutes for potatoes							
		Macaroni, spaghetti, and noddles	Rice	Dry beans, peas, and lentils	Sweetpotatoes	Bread, pancakes, and waffles	Green and leafy vegetables	Grits, corn meal mush	Other vegetables
	Pounds	*Percent*							
Areas									
U. S.	2.7	77	48	19	11	10	10	9	8
"North"	2.8	80	42	19	10	11	11	5	8
South	2.0	61	72	17	16	7	7	27	9
Cities									
Boston	2.8	84	24	29	6	9	10	1	6
Chicago	2.3	75	44	19	12	23	10	5	8
Los Angeles	2.4	74	55	24	12	10	12	4	15

According to Table 1, even though macaroni, spaghetti, and noodles were more frequently mentioned than other potato substitutes

they apparently displace potatoes to a lesser degree than do rice, sweetpotatoes, grits, corn meal mush, and other vegetables.

The major reasons given for using particular foods as substitutes for potatoes were (a) they add variety to the meals, (b) they taste good and the family likes them, and (c) they are a good source of starch.

For the United States, consumers in the low-income group reported an estimated weekly average potato consumption, per capita, of 2.8 pounds compared with an estimated 2.6 pounds for consumers in the middle-income group and 2.5 pounds in the high-income group. A similar relationship held true in each of the regional and city comparisons.

Another objective of the potato preference survey was to learn whether consumers might not be able to get the potatoes they want in the form they want them. The factors which consumers said they considered most important were quality, size, and price. Of these, homemakers said that quality in potatoes was preferred above the others, size was next in importance, and price was third.

There was some indication that consumers were unable to get the quality of potatoes they desired. Fifty-one percent of the interviewed household consumers in the South mentioned as objectionable defects in potatoes purchased soft spots, rotten on the outside, wrinkled, shriveled, or old looking. Only 30 percent of the interviewed consumers mentioned any one of these defects in the North. Well over half of the interviewed homemakers in the United States said some of the potatoes they bought in the fall of 1947 had interior faults. A like proportion of homemakers so reported in the areas tabulated separately.

Dark streaks were specified more frequently as a defect than any other by the homemakers in the areas tabulated. Southern homemakers mentioned hollow centers and internal decay more often than did those in the North; the northern homemakers cited "cooking up black" more frequently than did those in the South.

It would appear that consumers are not able to buy the exact sizes they prefer. Questions as to size preferences were answered in relation to the consumers' use of potatoes. Fifty-eight percent of these homemakers interviewed reported that they buy all-purpose potatoes only. An additional 30 percent reported they buy an all-purpose plus one special-purpose potato. The special-purpose potato was predominantly a large potato chosen primarily for baking.

Of the 88 percent of the consumers reporting buying all-purpose potatoes, 81 percent preferred medium-sized potatoes for general use. Only 60 percent reported they purchased a medium-sized potato. Eight percent of the consumers who said they buy general-purpose potatoes said they preferred mixed sizes, but 26 percent reported usually buying mixed sizes. Forty-six percent of consumers buying mixed sizes said that they did so because packaged potatoes come in mixed sizes.

When quality is good and prices are low, 20 percent of these consumers reported that they buy more potatoes. However, 90 percent reported that price was not a factor in their use of potato substitutes.

In order to learn the extent to which consumers' inability to obtain the quality and size of potatoes they prefer affects potato consumption, it will be necessary to evaluate these preferences in terms of prices paid and quantities bought. This will require controlled experiments or the use of pantry inventories at the time of personal interviews, after the desired quality and size of potatoes have been made available in the retail stores.

There appears to be no one best way to market potatoes. According to this study 64 percent of the consumers interviewed said they preferred buying their potatoes from open bins, whereas 17 percent said they preferred packaged potatoes, 16 percent reported no preferences, and 3 percent were not ascertained. In general, consumers haven't a good place to store potatoes. Most of the consumers said they preferred medium-sized potatoes. With this preference in mind it would appear advisable to market all medium-sized potatoes, find special outlets for large-sized potatoes, and leave the small ones at home except when demand is sufficient to cover marketing costs.

Further research needed: What are the survey findings that point to further action and research by the potato industry? The need for evaluating preferences for potato quality and sizes in terms of quantities bought and prices paid has been indicated. The survey also revealed that these consumers think they want potato grades clearly marked on the bins, bags, and packages apparently to guide them in selecting better quality, even though these consumers were not fully informed as to the meaning of the grades. The survey revealed that people generally have not thought of buying potatoes for specific uses other than for baking. This suggests investigating the possibility of packaging and marking some potatoes for par-

ticular uses. One of the reasons given for using potato substitutes was "They add variety to the meals." This suggests acquainting some consumers with a greater variety of ways of preparing and serving potatoes. Although these consumers were rather generally aware that potatoes are a valuable source of starch, they were not fully informed as to the other food values of potatoes. This suggests acquainting consumers with food values other than starch to be found in potatoes.

Summary

In general consumers said they wanted medium-sized potatoes bright in appearance with smooth skin, clean surface, few and shallow eyes and no spots or blemishes. Quality was the one factor they wanted most. Apparently to insure quality they preferred to select their potatoes from bulk and also to have grades marked on bins, bags and packages. They wanted their potatoes to be free from hollow hearts and dark streaks and lumps when cooked. They preferred one all-purpose potato which would cook up mealy, evenly and soft throughout without falling apart.

THE NORTH-CENTRAL STATES REGIONAL POTATO MARKETING PROJECT CONTROLLED RETAIL STORE EXPERIMENT*

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The Quality-Price Relationship of Potatoes at the Retail Level

THE Technical Committee for the North-Central States Regional Potato Marketing Project decided to confine activities during the 1947–48 season to an appraisal of retailer and consumer reactions by means of controlled retail offerings of potatoes graded to special experimental specifications and uniform size standards. With one exception the sizes chosen conform to those promulgated in the USDA Consumer Standards for Potatoes effective December 8, 1947. The committee felt it would be advantageous to use a $1\frac{7}{8}$ inch rather than a $1\frac{1}{2}$ inch minimum size during the experiment. Therefore, the potatoes were graded U. S. No. 1 and sorted into three sizes: $1\frac{7}{8}$ to $2\frac{1}{4}$ inches; $2\frac{1}{4}$ to 3 inches; and 3 to 4 inches. These sizes were called Small, Medium, and Large. Each car contained potatoes from the same lot which were not sorted into the various sizes. These potatoes were called Not-Sized and were used as a check on the sized tubers.

The tubers were selected from representative lots of Bliss Triumph potatoes produced in the cooperating states. The Nebraska, North Dakota, and Minnesota committee members arranged for the washing, grading, sizing, packing, and shipping. Eleven cars were used in the experiment and were displayed in the stores from January 5 to March 20, 1948.

The Production and Marketing Administration cooperated on the project by inspecting the potatoes of each size class in each car for quality and condition. Inspections were made at shipping point, in the receiver's warehouse, and in the retail stores to secure data on grade, damage, and injury at successive stages during the marketing process. Four times the amount normally used for an inspection was examined. The potatoes were rated in the retail stores by the inspector and the University representative according

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

to condition and appearance. The general appearance of the display was also rated.

One car was shipped every week and arrived in Chicago in time for the potatoes to be placed on sale Monday morning. Arrangements were made with the stores to display only the potatoes from the latest car in order to maintain quality and so that sales would reflect the size-price relationship rather than quality-price relationship. The displays were renovated during the week by the store personnel according to their usual merchandising practice.

The Small, Medium, Large, and Not-Sized potatoes were displayed side by side on racks or tables. Each size occupied the same amount of display space and the same quantity of each was offered for sale. Bliss Triumph were the only red potatoes on display in two chains. McClures were offered for sale in addition to Bliss Triumph in the other two chains.

The store personnel kept the data on sales and discounts. The PMA personnel assisted the University representative in securing data on shrinkage and freezing.

Specific objectives varied between the chains. In Chains A and B prices were adjusted in order to secure an equal volume of sales of all sizes. In Chains C and D prices were set to secure volume of sales by size in the same ratio as the potatoes were produced. The prices for the various sizes were the same during the first week of the experiment in each chain. They were then adjusted in order to secure a volume of sales in line with the desired objective. Retail prices were set each week upon consultation with the chain store officials. The basis of pricing was to sell the Not-Sized at cost plus usual mark-up and to sell the sized potatoes so that the average price per pound would be the same as for the Not-Sized.

A consumer interview phase was conducted in cooperation with the Bureau of Human Nutrition and Home Economics. A representative of the Bureau interviewed purchasers of potatoes in the stores used in the experiment of one of the chains at various intervals from February 28 to the close of the size-price experiment on March 20. From then until May 1, customers in chain and independent stores in several parts of the city and its suburbs were interviewed.

A survey of potato merchandising practices in Chicago retail stores was conducted in cooperation with the Bureau of Agricultural Economics. Interviews were secured in 520 stores that handle

fruits and vegetables. These stores were selected at random from a listing of all such stores in the city.

Preliminary analysis of the data secured indicate that the Small potatoes will outsell or equal the sales of the Not-Sized when the price of the Small is 85 percent or less of the Not-Sized. The sales of the Medium will exceed those of the Not-Sized until price of the Medium exceeds the price of the Not-Sized by 15 percent. Sales of the Large were as great in relation to the sales of the Not-Sized when prices were 15 percent above as when the price was five percent below. This indicates that some people want large potatoes and will pay a premium to get them.

The specific objectives of securing an equal volume of sales of all sizes was fairly well achieved in Chain A during the last week. During the first week when prices for all sizes were the same, 5.5 cents per pound, the percentages of sales were Small 12.9, Medium 39.5, Large 29.9, and Not-Sized 17.7 percent, but during the last week when prices were 5.3 cents per pound for the Small, 6.3 cents for the Medium, and 5.9 cents for the Large and Not-Sized, the sales were Small 22.3, Medium 24.9, Large 25.1, and Not-Sized 27.7 percent of total sales. During this week when sales were approximately the same the price of the Medium was 0.4 cent per pound above the Large and 1.0 cent per pound above the Small. The price of the Large was 0.6 cent per pound above the Small.

The objective in Chain C and D, selling the three sizes of potatoes in the same ratio that they were produced, was fairly well achieved in Chain C during the next to last week. Sales in comparison with total sales of the three sizes were 12.6 percent for the Small, 76.4 for the Medium, and 11.0 percent for the Large. The shipping ratio was Small 17.3 percent, Medium 74.7 percent, and Large 8.0 percent. Prices during this period were 6.2 cents per pound for the Small and Large, and 5.4 cents per pound for the Meduim. During the first week, when prices were the same, the proportion of sales was 23.2 percent for the Small; 52.3 for the Medium; and 24.5 for the Large.

During the last week prices were changed to 6.6 cents per pound for the Small and Large and 6.2 cents for the Medium. The ratio of sales changed to 25.1 percent for the Small; 56.8 percent for the Medium; and 18.1 percent for the Large. Thus, when the prices per pound of the Small and Large were increased 0.4 cent per pound from 6.2 cents to 6.6 cents, and the Medium 0.8 cent from 5.4 to

6.2 cents, the proportion of Small and Large sold increased, and the sales of Medium decreased from 76.4 percent of total sales of the three sizes to 56.8 percent.

Data were secured from one chain on total potato movement in nine comparable stores to determine representativeness of the stores used in the experiment and the effect of experimental tubers on potato sales. Potato sales were greater during the experiment in the three stores used than in the nine similar stores. In the experimental stores a significantly greater quantity of red potatoes was sold than white, but in the similar stores the quantities of the reds and whites sold were practically the same. In another chain data were secured on total potato sales in the three stores used in the experiment and in all other stores in the chain. A comparison of sales showed the three stores to be representative of the chain. Total potato sales were not increased in the three stores used during the experiment compared to all stores. However, the sales of red potatoes were maintained at a higher level than the whites in the experimental stores. The sale volume of red potatoes compared with white in all stores of this chain was almost identical during the experiment.

An analysis for variance shows that the variance between selling period, carload, and distributor and size of potatoes did not differ significantly from the variance for error. The consumer preference remained fairly constant from week to week except as influenced by change in prices. Between distributors the variance was slightly higher than the variance for error but too low to have any significance. The difference in consumer preference between stores was not constant.

Several factors which would affect potato sales were shown on the inspection certificates. The shipping point inspections revealed considerable variation in defects among the different sizes. The damage due to bruising increased slightly with the large tubers. The average percentage of bruised potatoes listed as injury also increased as size increased. Occurrence of other defects varied little between sizes.

The receiving point inspections showed a considerable increase in injury per car from shipping point to warehouse, and that the injury increased as the size of tuber increased. Air cracks were not apparent at loading time, but the warehouse inspections showed air crack damage. Retail store inspections indicated that the number of defects increased as the size of tubers increased. The principal

defects causing the increase were shatter bruises, air cracks, and light burn.

The consumer interviews were sorted according to the number in the family over one year of age. Except for families having one and six members per family, the purchase of Medium potatoes increased as size of family increased. Approximately one-half the purchasers indicated that they were not concerned with price because they had not noticed the price differentials. There was no apparent relationship between price and size of family. More than 82 percent of the purchasers interviewed from March 20 to May 1 said they always bought potatoes of the same size. With the exception of the one-member-per-family group, which preferred smaller units, five to six pounds was the most frequent quantity purchased.

The executive committee has approved the following plans for the 1948–49 year: (1) Use three stores of one chain at a time in various areas of Chicago; (2) Use potatoes of the same three sizes as in 1947–48; (3) Use potatoes from one source during one period; (4) Omit check lot; (5) Use nondifferential prices during the first week for each variety.

QUALITY FACTORS AFFECTING THE PRICE OF PEACHES ON THE BENTON HARBOR MARKET*

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PEACH prices fluctuate widely. The fluctuations which are caused by changes in the general price level, size of the crop, and volume of marketings can be controlled very little by the individual producer. The purpose of the study was to determine the amount and causes of price variations which are due to factors within the control of the grower.

The study was made on the Benton Harbor Wholesale Fruit Market because of its large volume of business, and because sales are made by personal inspection. About 1,300,000 bushels of peaches or 28 percent of the Michigan Crop were sold on this market in 1947. Sales on the market are made on an individual basis with the buyers and the individual growers bargaining to reach an agreeable price.

The scope of the study was limited to the Halehaven and Elberta varieties which made up about 78 percent of Michigan production in 1947. The study was further limited to those peaches marked U. S. No. 1, 2 inch and up. This size and grade included most of the peaches marketed on the Benton Harbor Market.

Data for the study were gathered between September 1 and September 23, 1947. This period included the peak marketings of both varieties of peaches. To gather the data the enumerator mingled with the buyers and recorded observations on the various loads of peaches as they were sold. The peaches were rated on general appearance, firmness, defects, percent of red color, and the shade of red and green color. The size of the load, type of package, time of sale, the location of the seller on the market, and other factors which were thought to influence prices were also recorded. Observations were made of those baskets opened by the buyers.

Results

The appearance of peaches was found to be the most important factor causing price variations within grades at any given time.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

Halehavens with fair appearance brought 24 cents per bushel less than those with good appearance, and 37 cents per bushel less than those with excellent appearance. In the Elberta variety the differences were not as great, but they were significant.

Several factors were found to be associated with general appearance. One of the most important of these was the improved appearance due to the presence of shredded paper or cellophane on the face of the peaches. Appearance also improved as the percent of red color on the peaches increased. In the Halehaven variety any increase of red color over 50 percent seemed to make no improvement in appearance, while the increase of red color improved the appearance of the Elbertas throughout the entire range observed. Brushing the peaches improved appearance. It was more important in the Elberta variety, which normally lacked color. The shade of red or green had no effect upon general appearance.

Firmness or ripeness had a significant effect upon the price. In the Halehaven variety soft peaches brought 26 cents per bushel less than very hard ones when appearance was fair, and 12 cents per bushel less when appearance was good. When appearance was excellent the price differences were not significant. During the 1947 season, 46 percent of the Halehaven peaches marketed were very hard 46 percent firm, and 8 percent were soft or very soft. Since very hard Halehaven peaches brought the best price, about one-half of the peaches studied may have brought better prices had they been marketed earlier. Most of these Halehavens had ample size and color to have been marketed earlier.

The effect of firmness was different in the Elberta variety. When appearance was excellent, firm peaches brought about 16 cents per bushel more than very hard peaches. There were no significant price differences due to firmness in fair or good peaches. Elberta produces marketed 93 percent of their excellent quality peaches at the very hard stage. This indicates that many of these growers might have received a better price if they had marketed later. It is also possible that some of the Elberta peaches with fair and good appearance may have attained excellent appearance had they been allowed to mature.

Defects caused significant price differences. Their greatest effect was found in the peaches in the poorest appearance classes. Bruises were the most costly defects while knots and other defects that detracted from appearance also caused lower prices. In general, the

buyers were most critical of the peaches with defects that might impair shipping quality.

Percent of red, brushing, and the use of shredded paper on the face of the basket, affected prices through their effect on appearance. Shade of red, shade of green, fullness of package, and type of package had no effect upon price. Some of the difficulties of measuring the associations between factors related to general appearance and price will be discussed later.

Both varieties of peaches were grouped together to study price variations due to imperfections in the market. For this analysis such factors as time of sale, type of buyer, and position on the market were observed. It was found that farmers who sold their peaches after four p.m. on days the market price movement was up received higher prices. Peaches brought better prices in positions near the market entrance when the price movement was steady. This was due to the different actions of the buyers on different days. Other market-factor variations were found to have no significant effect on price.

Methods of Analysis

The analysis was made with International Business Machines. To remove the effect of seasonal price variation, each sale price was compared with the daily average price taken from the Federal-State Market News Service reports. All tabulations were made using these variations from daily average price.

Sorts were made on all factors that were thought to have an effect on price, and the variations from the average prices were tabulated for each group. Where the tabulations indicated possible price differences due to the sort factors, the results were tested for significance. For this test, an adaptation of the analysis of variance known as the F test was used. Significance was determined by comparing the variance between groups with the variance within groups. Since there were unequal numbers of cases in each group, it was not possible to use the F test on all subsorts. To overcome this difficulty all factors were first sorted on the basis of appearance, and subsequent analyses were made separately within each of the three appearance classes.

To prevent the reporting of results that may have been due to chance, only differences significant at the five percent level or below were used. Most of the reported findings were significant at one percent.

The Chi-square test was used to measure association between appearance and other factors. It was not possible with this test to show the percentage of variance in appearance due to variance in the observed factors. If factors such as appearance, presence or lack of shredded paper, color, and fullness of package could be assigned accurate numerical values, correlations would have been used to determine these percentage relationships. The problem of assigning accurate numerical values to such factors as those mentioned is one that would seem to merit more study. It is a problem that is common to all quality-price studies, and especially those in fruits and vegetables.

In this study the tests of significance were most useful. Without them several apparently significant quality-price relationships would have been reported as being significant except for the fact that tests showed they could have been due to chance. The weeding out of relationships of questionable significance made it possible for the authors to be a great deal more specific in their statements than would otherwise have been the case. It also protects the user of the results.

DETERMINING CONSUMER PREFERENCES FOR SWEET POTATOES: METHODS AND RESULTS*

MARTIN ABRAHAMSEN
North Carolina Agricultural Experiment Station

EXAMINATION of marketing problems under investigation at land-grant colleges indicates that most research workers have given relatively little attention to studies of consumer preferences for agricultural products. These workers often have overlooked the fact that buyers with market baskets are a source of information that can be useful in improving the marketing system. Buyers also have been ignored by farmers and representatives of marketing agencies who tend to rely on their own personal opinions and hunches in evaluating the wants of consumers. In fact, considerable wishful thinking and rationalization have characterized the views of the produce trade on matters of consumer preferences.

It is being recognized, however, that the likes and dislikes of the homemaker, her opinions and prejudices, and the amount of money she has in her pocketbook, all are important items in determining the merchandizing methods used and the products bought. In buying any product the homemaker is confronted with the need for making decisions. These decisions, among other things, are affected by degree and kind of packaging, prevailing prices, and extent to which other products may be substituted. The question arises then as to methods which should be used in obtaining an objective measure of consumers' preferences as a first step in developing a merchandizing system for specific farm products.

Methods

Attention in this paper is directed primarily to methods used and results obtained in a study of consumer preferences for sweet potatoes conducted at the North Carolina Agricultural Experiment Station.[1] Reference also is made to somewhat similar studies conducted by Professor J. M. Baker of the Louisiana Agricultural Experiment Station.[2]

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

[1] Martin Abrahamsen, Tech. Bul. No. 82, *Consumer Preferences for Sweet Potatoes*, N. C. Agr. Exp. Sta., Feb. 1947.

[2] J. M. Baker, Bul. 409, *Consumer Preferences in Sweet Potatoes*, Jan. 1947 and Bul. 422, *Marketing Louisiana Sweet Potatoes in Pittsburgh*, Sept., 1947. Louisiana Agr. Exp. Sta.

In planning the study consideration was given to devising means for objectively measuring consumer choice. Attention was given to the development of techniques for controlling the quality of the sweet potatoes used in testing preferences. It was recognized, however, that matters of interview procedures and sample techniques also were especially important in the successful prosecution of these studies.

Quality Control Techniques. In developing techniques to be used in conducting the study and as a means for testing the reliability of the information obtained, arrangements were made to make a trial run in an "experiment store." Four sales methods were tried. They were: (1) Giving buyers free access to various grades of sweet potatoes and permitting them to select those they desired, (2) selling graded sweet potatoes in three and five pound mesh bags, (3) permitting buyers to indicate the grades they desired and then having an attendant select potatoes as they came so as to maintain uniformity of size and quality, and (4) selling sweet potatoes according to size—small, medium, and large.

With the exception of the last method in which only U. S. No. 1 sweet potatoes were sold, all other test methods included the sale of four different grades of sweet potatoes. They were: (1) U. S. Extra No. 1, (2) U. S. No. 1, (3) U. S. No. 2, and (4) Unclassified or "warehouse run." These grades of sweet potatoes were priced at 11, 9, 7, and 5 cents, respectively. Prices were established in consultation with produce dealers and were believed to give a quality and price relationship that was in accordance with conditions prevailing at that time. All sweet potatoes used in this study were graded by official inspectors of the State Division of Markets.

After these methods of sale were tested, the following conclusions were reached:

1. In testing preferences, consumers were not allowed to select their own sweet potatoes even though this was the common procedure followed in retail stores in the State. To permit such a practice would result in progressive deterioration of the quality available. Under these conditions, buyers would tend to select the best sweet potatoes and it would not be long before the remaining ones would be out of grade and the price-quality designation established for purposes of study in effect would be meaningless. Furthermore, if attendants attempted to force these out-of-grade, poor quality,

sweet potatoes on the buyers, many would try to shift to other stores or would forego purchasing sweet potatoes altogether.

2. Selling sweet potatoes in mesh bags permitted adequate control of quality. This procedure, however, represented such a radical departure in established retail practices that most consumers were hesitant to make purchases. Many buyers expressed the belief that they often had been "stung" in buying sweet potatoes and they had no inclination to buy a "pig in a poke."

3. Selling sweet potatoes on the basis of size proved feasible. These tests, however, were postponed to a later date in order that information as to grade, price, and quality relationships could be obtained.

4. The practice of having buyers indicate grades and then arranging for an attendant to select, weigh, and mark the price for these potatoes gave indications of assuring the maintenance of quality. This method of sale, therefore, was chosen as the best one for conducting the study.

Facilitating Practices. After the most satisfactory sales method had been determined, the following practices were adopted to implement this method:

1. After arranging with store managers to conduct this study, research workers of the Department of Agricultural Economics took full charge of the sweet potato section of the produce counter in these stores. Full responsibility was assumed for obtaining sweet potatoes of the desired grades, for arranging to have them in the store on the date of sale, for setting up counter displays, for keeping all bins supplied, and for waiting on customers, including selecting potatoes, weighing them, and marking the total charges on the bags.

2. Sweet potatoes were displayed in four consecutive bins on the produce counter at six markets and in bushel baskets at two of the smaller stores. The order of display was changed each day so as to allow for whatever influences location might have on the preferences expressed by consumers. Variations in grades, furthermore, were brought into focus by order of arrangement. During a given period, for instance, U. S. Extra No. 1's were placed next to the Unclassified sweet potatoes. The order of the four grades being as follows: (1) U. S. Extra No. 1, (2) Unclassified, (3) U. S. No. 1, and (4) U. S. No. 2.

3. Consumers were interviewed during two days in each of the stores selected. The accepted practice was to work in one store on Friday and Monday and another store on Saturday and Tuesday. This permitted recognition of differences that might prevail because of the time of shopping. For example, buying habits of individuals who bought on the first of the week might differ from the habits of those buying on weekends. All tests were conducted during the months of February and March.

4. Consumers were interviewed only after making a purchase. It was not until they were handed their bag of sweet potatoes by the attendant that their attention was called to the fact that a representative of the Experiment Station (located in an inconspicuous place) would like to talk with them about their sweet potato buying practices.

5. An effort was made to interview all consumers purchasing sweet potatoes. This was possible except for a limited number of purchasers on weekends (perhaps not over 20 percent of the total) who could not be interviewed because of the concentration of buying during certain hours.

6. For the purpose of testing the frequent assertion that prices were of no concern if quality of sweet potatoes were available, permission was obtained from the OPA to increase prices of U. S. Extra No. 1 from 11 to 15 cents per pound for supplementary tests in Raleigh and Asheville.

Results

The results of this study were obtained by using the produce counter as a laboratory for measuring buying practices under actual market conditions. Emphasis here is directed to findings that show the relationship of income to the amount and the quality of sweet potatoes purchased.

Consumers were grouped into three classes: those earning less than $100 per month, those earning $100 to $199, and those earning $200 and over. Findings showed that weekly per capita purchases in the lowest income class were highest and averaged 1.6 pounds. This compares with a low of 1.1 pounds in the highest income class. In other words, consumers in the low income class purchased 45 per cent more sweet potatoes than did the high income group. These findings support the common observation that the sweet potato is a "poor man's food."

With respect to quality, 28 percent of the sweet potatoes purchased by the lowest income families were U. S. Extra No. 1 and 37 percent were U.S. No. 2. This compares with the highest income group in which 65 percent of all purchases were U. S. Extra No. 1 and 8 percent were U. S. No. 2. (In general similar results with respect to grade preferences were obtained by Baker.)

Findings of this study indicate that in the years ahead sweet potato producers would benefit by giving greater attention to: (1) producing the types and varieties desired, (2) following better grading practices, (3) encouraging the development of a system that establishes prices in accordance with the quality produced, and (4) finding ways of increasing the over-all efficiency of the marketing system.

This study also has important implications for the wholesale handler and retail merchant. Once the buying practices and consumption habits of consumers are known, market agencies have the responsibility of taking steps to provide the grades, varieties, and qualities that are in accordance with the preferences of the trade. They also can contribute to the development of better sweet potato marketing methods by establishing a pricing system that adequately reflects variations in the quality purchased and sold.

ROUNDTABLE ON OUTLOOK INFORMATION

Chairman: George Montgomery, Kansas State College

USE OF OUTLOOK IN AN EXTENSION PROGRAM*

L. C. CUNNINGHAM
Cornell University

WITH such a topic assignment, one might either discuss what should be the use of outlook in an extension program or give an experience even at the risk of bragging. I shall exercise reasonable restraint and present our experience in New York State. I know that other states have made effective use of outlook in their programs but perhaps more justice is done if they tell their own story. Even though limited to one state, actual experience should be more worthwile than theory or speculation, and perhaps it will serve as a more suitable basis for the group discussion which is to follow.

This discussion will include the use of outlook in both the Agricultural Economics Department and College Extension Programs.

In the Agricultural Economics Department program, outlook occupies an important place. Our activities for the past year may be used as an illustration. Following the National Outlook Conference in Washington, staff members in the department who are responsible for the outlook work assemble the pertinent statistics relative to the general price outlook, to costs in farming, and to each of the important commodities in the State. These data were the basis for a thorough discusssion by this group of the general outlook and of each important commodity. The tables and graphs were assembled in a report called the "Economic Handbook, 1947–48." After our own Department staff discussion, members of other departments in the College were invited to review the statistical background for the outlook for the different commodities. And following these sessions narrative reports were prepared which became the manuscript for the "1948 Outlook Bulletin." This was printed in an edition of 100,000 copies for general distribution among farmers and others in the state.

Equipped with this Economic Handbook, slides and wall charts and advance copies of the outlook bulletin for use as teaching

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

materials, we held a state-wide economic conference for county agricultural agents in early December. This conference set the stage for activities at the county level, including a limited number of county and community meetings as such, the use of some outlook as introduction to other meetings and the distribution of the bulletin with a covering letter by the county agent. This launching of the outlook work is followed up from time to time during the year with general and individual commodity outlook statements.

In the College Extension Program, the work is carried on along commodity or type-or-farming lines. Specialists from departments directly concerned serve on committees for dairy, poultry, fruit, and the like. To illustrate further, the college dairy committee makes a dairy program at the state level to serve as a guide to the county dairy committees in making their programs at the county level. The dairy program for last year contained a section on the general economic situation and outlook as well as sections on the major dairy farm problems and the suggested educational activities and services available. The place of outlook in these commodity programs is not so much merely to include a brief statement on outlook as to keep the programs in tune with economic conditions. For example, in 1947, the outlook indicated a continuing shortage of milk in the fall season. Consequently, major emphasis was placed on this problem. Again, the Dairy Barn Management Program which is in its second year was initiated partially in view of the economic outlook for farm labor.

In summary, the use of outlook occupies an important place in the extension program in Agricultural Economics. Its primary objective is to give to farmers the facts on which they may make their individual decisions. The use of outlook in the College commodity programs is becoming of increasing importance. The principal objective here is to give major emphasis in the extension program to those problems that are highlighted by changing economic conditions.

OUTLOOK AND FARM MANAGEMENT*

L. F. MILLER
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OUTLOOK work has been linked closely with farm management from its very inception. This was made clear by the Secretary of Agriculture's report for 1923 covering the inauguration of this work in the Department, which stated that, "Producers need information to guide them in making proper adjustments between the acreage planted to various crops."[1] From that time forward outlook reports and farm management specialists have consistently emphasized the importance of providing farmers with information which would form a basis for adjusting production to future market conditions.

In view of this quarter century of outlook work it may be surprising to find in the literature considerable variation in the interpretation of just how outlook does fit into the farmer's problem of adjusting his business to changing economic conditions. Over the years farm management specialists have come to stress different uses of the outlook, depending largely on the basic character of the agriculture with which they are most familiar. It is not difficult to imagine, for example, the variations in emphasis that would be made by a farm management specialist working with general farmers in Iowa as contrasted with specialized dairy farmers in Vermont.

Because such sectional variations in emphasis may tend to narrow individual concepts of outlook work, it appears desirable to outline the major contributions that outlook can make to the successful operation of the farm business. The following categories are neither all inclusive nor mutually exclusive, but they do provide a needed framework for a broad perspective on the relation of outlook to farm management.

(1) Outlook information may be helpful in dealing with the short-run problems of timing both the sale of outputs and the purchase of supplies. This is often termed "Market outlook," since it is assumed that the physical and economic problems of production are largely past and the problem is now one of timing sales. With

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[1] Annual report of the Department of Agriculture, June 1923, p. 23.

certain types of farming this may be a highly important kind of outlook work. Provided it is reasonably accurate, such information will most certainly prove popular since the financial benefits may be great in relation to the extra effort involved and since many producers doubtless feel less competent to deal with marketing than with production.

(2) Outlook information may be helpful in short-run and intermediate problems dealing primarily with the alternative use of existing resources. The need for these adjustments develops primarily because of comparatively short-run shifts in *relative* prices. The possible questions farm operators may legitimately ask in this field because of the changing outlook are almost infinite. Should I plant more soybeans this spring? How much finish should I put on my steers? How many sows should I breed this fall? These are but a few examples.

In connection with these first two uses of outlook information the following questions might be raised for discussion purposes. First, is there any danger of overemphasizing this type of work to the possible detriment of such fundamental farm management factors as the scale of operations, the basic organization of the business and the over-all efficiency of production? Second, has adequate recognition been given the possible ramifications and effect on the individual's total farm income of suggested adjustments in line with the general outlook? What appears to be a highly desirable adjustment in view of prospective prices may not look so promising after we have appraised its possible effect on total farm operations and on labor income. The efforts to get farmers to develop production plans which call for marketing their product when prices are usually seasonally high is a case in point. As Professor Black points out "But it is always possible to produce for these high-priced markets at an increase in cost which is more than the increase in price. Probably only the more successful farmers who feed the better rations, who have the better-bred livestock, and who house and care for them better than the average farmer, can obtain 'out-of season' production at low enough costs."[2]

(3) Outlook information may be helpful in cyclical and longer-run problems dealing primarily with desirable adjustments in the basic organization of the business and with the scale of operations. These adjustment problems stem from cyclical changes in the general

[2] Black, Clawson, Sayre, and Wilcox, *Farm Management*, 1947, p. 462.

price level or from long-run secular changes in the demand and supply pictures for specific products rather than from short-run shifts in relative prices.[3] Although the educational problem of getting outlook information used is not considered in these comments, it should be clear that giving more emphasis to the longer-run outlook does not in any way reduce the necessity for localizing suggestions to fit typical farming situations within a given area.

For many producers where the short-run alternatives are distinctly limited, information dealing with desirable adjustments in line with the longer-run outlook for specific products and for prices in general would be highly useful in long-range farm planning.[4] Even in those areas where the emphasis tends to be on marketing and short-run production outlook because of the many available alternatives, the point might be raised regarding the need for relatively more effort on longer-run outlook. In this connection, the results of a survey conducted by Professor Mosher in 1936 on the use of agricultural forecasts by members of the Illinois Farm Bureau Farm Management Service are worth repeating—"While the majority of the best farmers, when answering the questionnaire, stated that they do make profitable use of agricultural forecasts, many of them emphasized the much greater dependence on a well-developed plan of crop and livestock production carried out consistently without much change from year to year."[5]

(4) Finally, outlook work may be helpful in developing a sound financial program for the farm family. In spite of the close relationship between a farmer's production and financial program, it is not safe to take the latter for granted simply because production adjustments have been made in line with the outlook. The character and amount of the farmer's various assets and liabilities may be the major factors in determining his ability to withstand economic reverses or to take advantage of a rising price level. Furthermore, the expenditures for the farm home have a direct bearing on the operation and financial position of the business. To be useful in this

[3] The need for such periodic long-time appraisals and their relation to the annual appraisal of desirable production adjustments was pointed out by the *Report on Production Adjustment Research*, Farm Management Research Conference, Washington, D. C., November, 1946.

[4] For a good discussion of the type of adjustments that may be made in response to changes in the general price level see Sherman Johnson and Associates, *Managing a Farm*, pp. 338–46 and Hart, Bond, and Cunningham, *Farm Management and Marketing*, pp. 384–88.

[5] M. L. Mosher, this JOURNAL, February, 1937, p. 249.

connection outlook information should be geared to helping with such problems as the proper timing of capital investments and purchase of durable goods for the farm and home, and to appraising the family's financial balance sheet.

In the above outline, certain general questions have been raised regarding the use of outlook in farm management. No more could be done in the space available. In summary, these questions are: (1) has sufficient effort been devoted to the longer-run outlook and its effect on the total farm operation as contrasted with the shorter-run outlook and its emphasis on the alternative use of existing resources, (2) in both the short- and longer-run outlook, has adequate recognition been given to the fact that prospective prices are only one of the many factors that must be considered in arriving at a sound conclusion regarding the best production program for a particular farm, (3) and finally, have we given adequate attention to the need for longer-run outlook information that would be helpful in developing a sound financial program for the family. In other words, I believe we may still question the progress we have actually made on the next major phase suggested by H. R. Tolley in 1931 when he stated, "The next major step in the development of outlook work should, in my opinion, be to mobilize resources in a similar manner for work on other phases of the program *with major emphasis on determining farming plans and programs that will yield the highest returns in the years ahead* in the different agricultural regions of the country and developing ways and means of getting the results to farmers."[6] Perhaps it has been a question of the alternative use of our professional resources, for if we seriously applied ourselves to the problem of determining desirable short- and long-run production adjustments by size and type of farm, we would be forced either to forego considerable research work now under way or to increase the number of workers in farm management. While those of us in the field probably would suggest an increase in numbers, a less biased source might point out opportunities for more work along the lines suggested above through a critical appraisal of the research now under way.

[6] H. R. Tolley, "History and Objectives of Outlook Work," this JOURNAL, October, 1931, p. 534. Italics not in the original.

THE DEVELOPMENT AND USE OF ECONOMIC INFORMATION AND FORECASTS BY INDUSTRY*

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TODAY, industry makes more practical use of outlook information and economic forecasts than any other group. However, prior to recent years, many businessmen looked upon economic forecasts in much the same way that they regarded fortune-telling. Even today some businessmen feel that there is considerable hocus-pocus associated with forecasts, and that they must have their origin in a crystal ball.

This attitude is rapidly becoming the attitude of the minority. Most businessmen now realize that they have to make forecasts every day. When any businessman makes a decision on future policy, whether it concerns plant expansion, credit expansion, inventory controls, or any other aspect of his business, he makes a forecast. He first examines all the facts present in the current situation, eliminates all those which are not important to the decision, studies those which are important, and finally bases his decision on the results of these studies. This is exactly the procedure followed in making an economic forecast.

Those businessmen who now realize that they must make forecasts want these forecasts to be based on the best facts obtainable. Hence the demand from industry for outlook information.

Industry uses outlook information and forecasts as a basis for planning actions which, it is hoped, will result in greater profits. A forecast is of no value to business unless it becomes the basis for some action.

One other general point should be emphasized. In practically every case where a forecast is used, it is used to eliminate or minimize risks already inherent in a business. Seldom is a forecast used for the purpose of assuming an unnecessary risk.

Industry relies on outside sources for most of the economic information and forecasts which it uses. There are four principal outside sources:

* A paper presented at the annual meeting of the American Farm Economic Association at Green Lake, Wisconsin, September 15, 1948.

1. The Federal Government supplies much of this information. Those industries who supply farmers' needs or process farm products get much of their information from the Department of Agriculture and particularly the Bureau of Agricultural Economics.

   The men in the Bureau of Agricultural Economics should be complimented on the excellent job they have done in recent years in preparing outlook information. In addition to supplying the public with economic facts, they also express their ideas as to what these facts may mean in terms of the future. This is a most valuable public service.

   Industry also gets much economic information from other Departments of the Federal Government. Some of the more important are: The Bureau of Labor Statistics, the Department of Commerce, the Federal Reserve System, and the President's Council of Economic Advisers.
2. Another important source of economic information is Colleges and Universities. Information released by these Colleges and Universities can be classified into two types:
   (a) Listing and discussion of facts important in the current economic situation. These are often accompanied by general forecasts.
   (b) Analyses of the factors influencing the price and supply and demand for various commodities.
3. Industry gets much economic information from private research organizations. Some of these organizations are privately endowed, and the information is put out as a public service. Others are regular business concerns and sell their services to industry for a fee. In many cases, these private research organizations rely on the Government for their basic facts.
4. Probably the least important of the four principal sources is other non-competitive business organizations. Many banks, insurance companies, and other private business concerns put out regular reports covering basic economic facts. These are usually quite general in nature and therefore are of limited value. In some cases results of original research are released. These are of considerable value.

Many business concerns no longer rely entirely on outside sources for economic information. They now have their own departments doing economic research. These departments vary in size from one or two people to as many as a hundred or more in the larger companies.

Economic research carried on by these business concerns is usually divided into two general types:

1. Original research either in establishing facts, or studying already established facts, which cause changes in the supply or demand for a commodity or in the price of that commodity.
2. Coordination of outlook information and forecasts from all sources into workable plans of action.

> This type of research is important. Any outlook information or forecast must be tailored to fit a specific problem within a business. Such action plans must be in a form that can be changed quickly with any change in the basic situation. This means that maximum use can be made of forecasts which are based on studied facts. Only a minimum use can be made of general forecasts or those which are based on general or questionable facts.

Time will permit only a brief listing of some of the tools and methods used by private business in studying facts and arriving at forecasts.

Usually the first step in arriving at a forecast is to list all facts present in the situation which may be important to the final decision. The facts should be established before the forecast is made rather than trying to find facts that will justify a forecast which has already been made.

Past behavior of the data is studied to see if there has been a general seasonal pattern. In a few cases, such as eggs or milk, this general seasonal pattern may be the most important tool used in arriving at the final forecast. In other commodities seasonal patterns are of relatively little importance.

Conditioned seasonal studies—analogy studies—can be used more often than general seasonal patterns. Any period of time within a year may be considered in studying a conditioned seasonal. Factors are studied to determine which ones have been dominant over other factors when in similar combinations in past years.

The conditioning factor usually is an economic condition—for example a short corn crop, a rust scare in wheat, big exports of wheat, etc. However, it may be a technical factor such as wheat selling at an unusually wide premium over deferred deliveries. In this case the technical factor usually measures the net influence of many economic factors.

Correlation studies are used as one step in arriving at forecasts. Such studies will show the usual relationship between two or more series of data. Usually when the current price is very high or very low relative to its average relationship with supply and demand factors, it will adjust to a more normal relationship in a relatively short period of time.

How does industry make use of this outlook information and these forecasts?

Probably the greatest use of this information is in determining

when and where to buy raw materials and other supplies. Every industry wants to be assured of a steady supply of ingredients for processing. They also wish to avoid buying ingredients close to the high point in a market. While it is not expected that ingredients will be purchased at the exact low point in a market, pressure of competition demands that costs be kept on a relatively low basis.

With those commodities which can be hedged in a futures market, the actual price is not the important consideration. Here, the goal is to buy when the cash article is priced low relative to the future in which it will be hedged. This assures that inventories can be carried without any loss due to a reduction in cash premiums. With so-called non-hedgeables—those commodities which have no futures market—the goal is to purchase when the actual price of the commodity is close to its low point.

Economic information is used to determine where hedges can be placed to best advantage. Under certain conditions December wheat at Chicago may be expected to gain on May wheat. Under these conditions any hedge against cash inventories should be placed in the May future. Similarly under certain conditions, Chicago futures tend to gain on Kansas City futures. Here, hedges against cash inventories should be placed in the Kansas City market. Analogy studies show that hedges can be kept on a more favorable basis by careful selection of the market and future in which the hedge will be placed.

Many commodities have no futures markets. In some such cases studies will show that the price of a related commodity which has a futures market moves closely enough with the commodity in question so that it can be used as a hedge.

Outlook information and forecasts are used to determine where and when sales and advertising efforts can be expended to realize the greatest net return. For example, if the economic outlook for hogs is much more favorable than the economic outlook for poultry experience shows that more net dollars of profit can be realized by expending a greater than normal proportion of the sales dollar and sales effort in selling hog feeds than in selling poultry feeds.

Economic studies also show what areas of the country offer the greatest sales opportunities. For example, in recent years the East and West Coasts have been gaining relative to the Middle West in poultry numbers. This indicates greater sales opportunities for poultry feeds in those two areas than in the Middle West.

Many companies are using outlook information as a service to customers. This information can be used by salesmen in helping customers plan their operations. Last spring when the hog-corn ratio was unfavorable, our salesmen used a simple chart showing that in all past periods when such a ratio occurred there had been a quick adjustment to a more favorable ratio. Through this simple chart they were able to encourage some customers to go into the hog business at that time and thus be ready to cash in on the very favorable feeding ratios which exist today. The result is good will and a satisfied customer. The one difficulty in this use of information is to be sure that a situation is not exaggerated in order to gain a sales advantage.

A less frequent but most important use of this information is in determining where and when expansion of plant facilities may be desirable. The longer-time factors effecting the economy of a region should be one of the determining factors in the location of physical facilities.

In conclusion, I think we can say without qualification that industry wants more outlook information and more economic forecasts rather than less. I also believe that business would like to have those who prepare this information keep the following points in mind:

1. Always state the facts on which conclusions are based. If possible, give your weighting of the relative importance of these facts. The person using the forecast can then make his own analysis. It also permits him to recognize any change in the situation on which your forecast was based.
2. Make any statements concerning estimated future changes as specific as your analysis of the facts will warrant. A general or hedged forecast is difficult to use.
3. State clearly whether any conclusion is of a long-time nature or of a short-time nature. Many people who disseminate information and forecasts overlook this point. As a result, some readers assume that a forecast means immediately, while others assume that it means sometime in the more distant future.

If a forecast is worth releasing, it is worth putting into a form which people can understand and use.

ROUNDTABLE ON OBJECTIVE EVALUATION OF SOIL CONSERVATION

Chairman: Lynn S. Robertson, Purdue University

WHAT JOHN SMITH NEEDS TO KNOW ABOUT THE BENEFITS AND COSTS OF SOIL CONSERVATION*

H. B. James
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I ASSUME that it is my task to formulate questions which John Smith is likely to ask, and furthermore, questions which he needs to ask about the benefits and costs of soil conservation. I further assume that I am not supposed to answer the questions but merely to raise them. I have tried to keep my discussion within these limits.

One of the first things John Smith needs to know is the meaning of soil conservation. No doubt he has a general idea as to what it means, but are his ideas exact enough to afford a satisfactory working definition? For example, does John Smith think of soil conservation as simply a matter of preventing visible erosion, i.e., keeping the gullies from getting so deep and wide that they cannot be crossed with a mule, or does he consider and distinguish between fertility depletion and soil deterioration as does Schickele, Bunce, and other writers on the subject? Is he clear on the meaning of exploitation, conservation, and improvement? Does he realize that each of these can be either economic or uneconomic from the social and/or the individual standpoint.[1]

What, When, and How Are the Benefits Derived?

A second concept which John Smith will want clarified when approached about conserving his soil is: "What will I get out of it?" Not only will he want to know what the benefits are, but when they will be realized. Will he get the benefits immediately, i.e., within a few years; or will all of the benefits accrue to the next generation? Perhaps equally important is, how are the benefits derived? Must he completely reorganize his farm, change type of farming, and wait

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

[1] Arthur C. Bunce, *Economics of Soil Conservation*, Ames, Iowa, 1945.

several years for the new plan to become established before he can receive any benefits; or will it involve practices from which some response may be expected the first year as, for example, better fertilization and contour tillage? An example of the other extreme would be reforestation where the benefits would accrue slowly over, say thirty to fifty years.

In order to know what the benefits are, John Smith must have a method of measuring the results of soil conservation practices. although he might be willing to buy one "pig in a bag," it is not likely that he would be willing to buy all of his hogs this way. Just to be co-operative he may be willing to try a few conservation practices without knowing what the results will be, but he will not continue to adopt such practices unless he has some way of evaluating their effect on his farm business. Nor is it enough to be able to evaluate a few soil conservation practices. John Smith must be made familiar with alternative opportunities for maximizing the returns from his business.

Although John Smith's actions will be guided mainly by the benefits which accrue to him and not by those accruing to society as a whole (these may overlap considerably), he should know what the social benefits are. As a citizen he should know about the conservation of resources so as to maximize the benefits to society through time. Also, he should understand the ill effects of dust storms, floods, siltation of reservoirs, and the destruction of scenic and recreational values by the exploitation of the soil.

What Are the Costs and Who Pays the Bill?

The second question John Smith is likely to ask is: What are the costs of conservation and who pays the bill? Or perhaps, he may simply ask "What will it cost me?" Anyway, John Smith needs to know what the cost of adopting soil conservation practices are likely to be. Not only does he need to know the cost of conservation, but he needs information which will enable him to select those practices which are most economical for his particular farm.

In addition to the cost of conservation, the farmer needs to know the cost (or loss) without the use of conservation practices. This also applies to social costs (or losses), some of which are identical with those of the farmer and others which do not concern him directly.

The nature of the cost items and who pays the cost are important

to the farmer. Are costs made up primarily of capital expenditures, or would most of the items be classified as variable costs? Who is to pay the costs, and when are they to be paid? Are the costs to be divided between the farmer and the government? If so, how will costs be divided as to total amount and between capital and variable items? The answers to these questions will no doubt exert considerable influence upon the effectiveness with which any soil conservation program can be operated.

If conservation is not economic to John Smith, then someone else must help pay the bill if the job is to be done. Even where it is economic to the individual, some assistance may be needed because of ignorance, resistance to change and the lack of capital. The stability, or length of time assistance is to be provided, is important. If conservation is economic to the individual, it may be adequate simply to help the farmer make the changes in his farming system which are necessary to soil conservation, assuming that the farmer will not need assistance once the inertia of change has been overcome. On the other hand, if conservation is uneconomic to the individual, it will be necessary to continue to provide assistance. At any rate, the farmer will need to know the type and permanency of assistance available.

What Is the Relation of Benefits to Costs?

The magnitude of benefits and costs are important to John Smith because of his limited resources and the risk involved, but the relationship of one to the other is of primary concern. John Smith needs to know when soil conservation is economic to him and when to society. To determine this, not only should he know the effects of practices on net income, but he should know the effect on net returns which include changes in capital. He should know price-cost relationships and physical responses for soil conservation practices so as to know when exploitation, conservation, and improvement are economic or uneconomic. Obviously, if conservation is economic to him, then exploitation and/or improvement must be uneconomic.[2] Many farmers are aware of the advantages of depleting their soils through one period of time and improving them

[2] Arthur C. Bunce, op. cit., p. 10. "Conservation (capital maintenance) is essentially an equilibrium concept and is economic for the individual when further investment or disinvestment is uneconomic. At this point marginal returns from investment equal marginal costs, and marginal returns from disinvestment equal the value of the resource used up."

through another, but they need more information about physical inputs and outputs and price-cost relationships in order to determine the economy of such practices.[3]

Farmers need to be able to distinguish between fertility depletion which can be replaced without any permanent damage to the productive capacity of the soil and soil deterioration which does permanently impair the productive capacity of the soil and thus reduce its capital value.

What is Being Done to Promote Stability of Price-Cost Relationships?

Some forecast or assumption of price-cost relationships are essential to John Smith's determination of soil conservation practices to be followed. John Smith wants to know whether a production and price program has been developed to stabilize income or at least to mitigate the effects of highly variable prices. If price-cost relationships are subject to wide variations, the risk involved in agricultural production is increased; and John Smith may be even less willing to practice soil conservation without outside assistance.

Summary

What John Smith needs to know about the benefits and costs of soil conservation can be summarized as follows:

First, he needs to know the meaning of soil conservation from the individual as well as the social standpoint.

Second, he needs to know what, when, and how the benefits are derived, and to whom they accrue. What changes will have to be made in his farming system, and how can he measure the results of soil conservation practices?

Third, he not only needs to know the cost of soil conservation, but he needs to know the kind, amount, and permanency of the assistance available.

Fourth, he wants to know the relation of benefits to costs for the individual and for society. When is conservation economic to the individual and when to society?

Fifth, John Smith needs to know what is being done to promote stability of price-cost relationships. Is there a sound program in effect which will mitigate the wide fluctuations in farm income?

[3] A larger total monetary income and greater net returns may be obtained over a period of years if crop production for market is emphasized during a period of high prices and crop production for soil conservation during a period of low prices, provided the soil is not allowed to deteriorate.

METHODS OF EVALUATING SOIL CONSERVATION MEASURES*

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FARMERS in the final analysis are the ones who will put conservation on the land. It is important that farmers have adequate knowledge of conservation and how it affects their farms and their incomes. Most farmers are in the business to make a living and are interested in the costs and benefits of conservation.

Research studies in the economics of soil conservation conducted under a cooperative research project between the Agricultural Economics Department, University of Illinois Agricultural Experiment Station, and Research Division, Soil Conservation Service, U. S. Department of Agriculture, were set up with the idea of providing practical answers to help guide farmers and those working with farmers.

Two general approaches have been used: (1) studies of the effects of specific conservation practices, and (2) studies of the over-all effects of conservation farming on the farm business as a whole.

Studies of Specific Conservation Practices

To measure the effects of contouring, contour strip cropping, and terracing, yield comparisons were made of crops grown on the contour, in contour strips, or on terraced fields on the contour, with the same crops grown on the same farms up and down hill or in the usual field pattern (Table 1). This comparison of crops

Table 1. Yield Increases for Crops Grown on the Contour Compared to Farming Up and Down the Slope on the Same Illinois Farms, Seven-Year Average, 1939–1945

Crop	Increases from contouring	
	Bushels per acre	Percent
Corn	6.9	12
Soybeans	2.7	13
Oats	6.9	16
Wheat	3.4	17

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

grown on the contour and not on the contour on the same farms eliminated, for the most part, differences in management and in practices.

No significant difference was found in total farm operating expense for labor, power, and machinery on farms operating on the contour and not on the contour (Table 2). Farms on which all or a major portion of the farming operations were on the contour were matched with farms of similar physical resources and following a similar pattern of farming but on which few if any field operations were on the contour.

TABLE 2. MAN LABOR COSTS AND POWER AND MACHINERY COSTS PER CROP ACRE ON 135 CONTOUR-TILLED FARMS COMPARED WITH 135 FARMS NOT CONTOUR-TILLED, FOUR-YEAR AVERAGE, 1940–1943

Item	Contour-tilled	Not contour-tilled
Man labor costs	$11.20	$12.04
Power and machinery costs	7.46	7.82

Studies of Effects of a Complete Conservation Farm Plan

Before adopting any new practice or program farmers are anxious to know "What will it cost?" and "What are the benefits?" Studies have been made of the effect of soil and water conservation programs on crop and livestock production and on farm incomes in selected areas of Illinois. Data were secured from farm survey records and from the Illinois farm account records. Two general approaches have been used: (1) comparisons of matched high- and low-conservation farms, and (2) before-and-after-conservation comparisons on the same farms.

In the comparison of matched high- and low-conservation farms, sample farms of similar land-use capabilities and size but with differences in the amount of soil and water conservation practices were studied. The general procedure followed was: (1) Farms were selected with conservation plans at least three years old on which a high percentage of the plan had been applied. These farms were then classified according to land-use capabilities and size of farm. (2) Neighboring farms were classified according to land-use capabilities and size of farm. (3) A sample of farms without conservation plans comparable in physical characteristics (land-use capabilities

and size) was matched with the previously-selected sample of farms with conservation plans.

These studies of matched farms have been carried out in six areas of Illinois. Ten years of records have been secured for the farms studied in McLean County, Illinois. A summary of the data shows that the benefits of a conservation program have been increasing relatively over the ten-year period (Table 3).

TABLE 3. CROP YIELDS AND NET FARM INCOME, IDENTICAL FARMS WITH HIGH AND LOW CONSERVATION, MCLEAN COUNTY, 1936–1945

	Twenty high-conservation farms[a]	Twenty low-conservation farms
Crop yield index[b]		
1936	97	103
5-year average, 1936–40	101	98
5-year average, 1941–45	104	96
10-year average, 1936–45	103	97
1945	106	94
Net income per acre[c]		
1936	$ 5.78	$ 6.54
5-year average, 1936–40	9.96	7.60
5-year average, 1941–45	23.94	19.77
10-year average, 1936–45	17.54	14.08
1945	27.51	22.64

[a] Conservation plans started from 1934 to 1937. In 1945 these farms had a conservation score of 83 compared to 59 for the low-conservation farms.
[b] Average yields of all crops for 40 farms equals 100.
[c] Returns for capital and management.

In 1946 a study was made of the "Economics of Soil and Water Conservation: Effect of Practices Followed on Farms in Selected Illinois Areas." Soil conservation scores were computed for each farm based on the degree of application of conservation practices to the needs of the individual farm. Each farm had the possibility of scoring 100 if all of its conservation needs had been met. After scoring, the farms were paired into high-score and low-score conservation farms for purposes of comparison. A management score for management other than conservation was computed for each of the farms based on a subjective evaluation of the individual farmer by the farm adviser (county agent), the AAA committeeman, the local conservationist, and the author. Conservation is, of course, an integral part of good farm management and for each group in each area studied high conservation was rather closely associated with

high managerial ability. The high-conservation farms spend more money for soil and related improvements—and the effect of these added capital improvements may have overshadowed the effects of so-called managerial ability.

In another study on the costs and capital requirements of a conservation program data were secured from two sources. (1) A survey was made of farmers' opinions as to the conservation needs on their individual farms. (2) The conservation farm plans as worked out by the farmers in cooperation with the farm adviser (county agent) and the conservation technician were analyzed to determine the conservation needs for the individual farms. Dollars and cents data were applied to both sets of data. In the slowly-permeable problem soils area of northeastern Illinois at the 1948 prices of establishing a conservation program, out-of-pocket cash costs would have averaged $12.80 per acre based on the farmers' opinion survey of conservation needs, and $22.66 per acre based on the needs as expressed in the actual conservation farm plans. The capital requirements for needed buildings, fencing, livestock, and machinery approximated an additional $12 per acre.

Studies based on "before and after conservation" have been largely limited in Illinois to case studies of individual farms. This type of analysis has the advantage of showing the influence of changes in the farming program where management and inherent land resources remain the same.

Problems in Connection with Evaluation of Conservation Measures

A few of the obvious problems are:

1. *Securing comparability of farms.* It is easier to match farms according to their physical land resources than according to capital resources, and it is even more difficult to match them on comparability of management.

2. *Securing continuity of sample.* It is difficult to secure data from the same operator on the same farm over a period of years and to find farmers who do not adopt conservation so as to have comparisons between farmers that use conservation practices and those who do not.

3. *The year-to-year changes necessary* in getting from a non- or low-conservation farm to a conservation or high-conservation farm merit much additional study.

4. *The economic utilization of forage crops* recommended in the conservation plan needs much additional study. Much of the gains from conservation is due to the larger amount of livestock kept and the higher returns from livestock on the high-conservation farms.

Summary

Our economic studies of conservation have helped to lay groundwork for further studies. We feel they have pointed out the following significant facts:

Contour farming increases crop yields, reduces soil and water losses, and on the average does not increase total farm operating costs. Conservation plans do not necessarily increase earnings immediately because usually considerable effort and money must be expended before positive results are achieved. Our evidence indicates that long-time benefits of conservation, however, are certain. Farms having conservation plans when compared with neighboring farms of similar physical resources show that conservation farms have spent more money for soils and related improvements; have more land in legumes and grass; higher crop yields; produce more and better quality hay and pasture; feed more livestock; have higher livestock production; and secure larger net farm incomes.

An interesting question is raised by the fact that in all comparisons high-conservation farms have had higher livestock efficiency as measured by "returns per $100 of feed fed." It can be argued, although our studies have not proved it, that it is the better feed supplies—grain, hay, and pasture—on conservation farms that explain the greater livestock efficiency. Conservation farming where needed represents progress. It is important to get farmers to adopt systems which in the hands of ordinary men—and that is what most farmers are—achieve general progress. Systems which conserve soil and water make better crop yields, make land easier to work, and apparently (although this is a tentative conclusion) provide better feed supplies, one of the bases for more efficient livestock production.

INTERREGIONAL ECONOMIC AND SOCIAL ASPECTS OF AN OBJECTIVE EVALUATION OF SOIL CONSERVATION*

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OUR soil conservation programs encourage the substitution of legumes and grasses for part of the intertilled crops and of wheat and other small grains in most of the important farming areas. Improvement of the yield and quality of the sod crops is encouraged in all regions to provide better protective cover for the soil and to increase the competitive position of grassland farming.

Widespread adoption and expanded use of these soil-conserving practices would bring about major adjustments in regional systems of farming. It would mean, for example, a reduction of cotton in the South; of corn and small grain in the Corn Belt; and of wheat in the wheat regions. The counterpart of these adjustments—larger acreages and better yields of grasses and legumes—would encourage changing the regional and interregional patterns of our livestock production.

As pasture and hay are fed largely to cattle and sheep, we could expect greater production of dairy products, beef and veal, and lamb and mutton. Whether the smaller acreages of the feed grains would result in some reduction in the production of hog and poultry products would depend upon the effectiveness of the longer rotations and other conservation practices in increasing the acre yields of corn and other feed grains. When they have been used long enough for their benefits to yields to become fully effective, it now seems likely that the total production of feed units from all sources would be increased on many farms. That has been the experience of most Midwest farmers who have changed over to soil conservation systems of farming.

The major agricultural regions would not share alike, however, in the prospective increases in forage-consuming livestock. That would be true even though the additional beef cattle, sheep and dairy products were obtained mostly from the additional forage produced. Forage resources in the range beef cattle and sheep areas

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and in the northeastern dairy region are limited in their flexibility. They can be increased only by better management practices that increase yields, whereas both the acreage and the yield per acre probably would be increased in the Corn Belt and in the South. Furthermore, it now seems likely that farmers in surplus grain-producing areas would use additional grain for supplementing the larger output of forage crops which they would feed to dairy cattle, even though the ratio of concentrates to forage in the average ration probably would be somewhat wider than now.

The need for more grain for supplementing additional forage, along with the possibility of some reduction in the production of feed grains due to fewer acres, might tend to curtail the usual outshipments of feed grains from the Corn Belt to feed-deficit areas. At least, farmers who are planning soil conservation programs, regardless of where they are located, should move cautiously in planning adjustments which would involve buying considerable additional grain to supplement the additional forage crops produced. Producers of grain probably will have less to sell from an average crop, except at a premium price.

The beef cattle herds on Corn Belt or Cotton Belt farms where the production of forage crops is increased probably would be carried largely on pasture and roughage. If cattle fattening enterprises are continued or set up on Corn Belt farms, the feeding period probably will be lengthened so as to use more pasture and less grain. Thus, the marketing of cattle for slaughter would tend to be concentrated more in the fall months and a larger proportion of them would be of the lower grades. That probably would modify the beef cattle price structure in the direction of greater seasonal variation and a wider spread between grades.

In some areas the need for shifting from soil erosive crops to grassland farming is so extensive that establishment of profitable farming units, which would be based almost entirely on grass, would mean consolidation of farms and fewer farmers. That in turn implies a new tax base and the curtailment of such services as those provided by roads, schools, and villages. On the other hand, where farming becomes more intensive, it may be necessary to set up new marketing facilities, such as creameries and local livestock markets.

These and many other prospective changes in the pattern of production and time of marketing have an important bearing on an objective evaluation of soil conservation, because they will influence

future price and cost relationships. It is unrealistic to separate future conservation benefits from the effects of prospective prices and costs in determining what would be desirable adjustments in farming in an area.

If the production of dairy products, for example, increases in areas outside the present dairy regions because of changes in the feed pattern, such increases will appear as new competition to those regions. And the lower prices for dairy products that would result in the absence of a sufficiently compensating increase in demand would be detrimental to the dairy farmers who have built up their farm plants on the basis of the situation prevailing before, unless they can increase production efficiency enough to offset the advantages created for dairying by the changes in the feed pattern in the other areas. Yet, even though greater efficiency may not be practicable in the older areas, the increase in production of dairy products may still be desirable from the national viewpoint. Perhaps our national production pattern should be shifted toward a larger production of dairy products to provide a better diet. And such a shift might mean a larger per capita income for all farmers as a group.

The new price relationships that would be brought about by the changes in the production pattern may also prove to be disappointing to the farmers who shift into dairying or beef cattle production, if the evaluation of soil conservation systems of farming is based on present instead of prospective costs and prices.

In making an economic evaluation of soil conservation systems of farming for a farm or a local area, we, as research and extension workers, generally have made the assumption that changes in the production pattern would not affect prices for the products produced. Also we frequently have disregarded the impacts on other farms and other areas. We cannot, of course, do otherwise satisfactorily until the interrelationships of prospective production patterns, demand, and prices are analyzed in closely coordinated research relating to all important farming situations.

The task of making the kind of analysis that is needed is exceedingly complex. It is probably beyond the scope of research in a single agency. Two closely related types of analysis would be involved. The first of these consists of an analytical study of the prospective supply and demand conditions and the probable equilibrium prices at various future dates, taking into account adjustments in land

use from the standpoint of soil conservation as a major influencing factor. The second type of analysis would be a study of the divergences between private and social marginal net products when the new systems of farming in one region impair the economic opportunities in another region. These over-all studies may have to be carried out with rough-and-ready data, particularly on the supply side. But our economic evaluations of soil conservation of an individual farm and in a local area will be much more fruitful if they are made within a more adequate framework of the prospective economic conditions. The changes in prices that are generated by the soil improvement practices on a multitude of farms also become a part of the forces influencing changes in the production pattern on those farms.

COOPERATING IN OBJECTIVE SOIL CONSERVATION RESEARCH*

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SOIL conservation is one of the more basic and long-run agricultural problems which faces the individual farmer and society. Both are concerned with (1) the level of conservation which is economic and (2) the economic means of attaining any given level of conservation. Although far from being fully developed and even though the two are complementary, the theory of conservation economics has progressed beyond empirical research. Principles have been developed which have universal application given the environment set forth in the basic assumptions. But in relatively few instances, indeed, can we point our finger to specific practices, farming areas, soil associations or resource ownership situations and indicate where conservation is or is not profitable to society or the individual. Even the amount of research relating to returns of individual farms has been extremely meager. Yet knowledge of returns to the individual is basic to any sound conservation policy or program. Extreme testimonials suggest that conservation either is or is not profitable to the farmer. Yet there is a dearth of objective research which might establish the facts. Why is this so?

One of the more important obstacles to empirical research in conservation economics has been the complex environment within which it must take place. The returns from conservation are easily confounded with returns from other techniques and resource combinations where attempt at measurement is made by means of such conventional approaches as management return, labor income or interest on investment. On the other hand study of major changes as rotations and land use make little sense unless considered as part of the farm as a unit and as related to livestock systems, labor requirements, capital investment, and the economic environment in general.

Measurement of soil conservation returns by means of records and surveys is extremely hazardous unless the sample is properly stratified by soil type, scale of operations and other farming tech-

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

niques or characteristics. Accurate estimates are perhaps possible only if the population studied is restricted to a group of farms homogeneous in all respects except attainment of conservation practices and related resource combination. The sample design must be as rigid as the controls of the physical experiment. Even then, the findings apply to a static price situation and a sample at one point in time. Ordinarily the study must be made for one year or a period of several years. Yet the results apply only to the price period used and may differ greatly from the economic world in which prices vary continuously form one level to another. Even were prices static in the sense that they remain at the same level or in the same relationship over time, data from a past period will not always provide correct income estimates for the future. Physical research indicates a widening gap in yields for two soils on which widely different degrees of erosion control or fertility maintenance is attained. Finally, the range of observations is necessarily restricted to the fairly narrow limits in terms of rotations, forage-grain rations and other practices which farmers have put into effect.

Estimation of returns by farm records can be made through appropriate stratification and sample design. However, it appears that a more promising alternative rests in cooperative research between the farm management worker and physical scientists in the fields concerned. Given the basis physical data, budget analysis can then provide income expectations under various price and resource ownership situations. Were it readily available a complete inventory of production functions, transformation rates or input-output ratios which relate to conservation could be put to use in designing conservation farming systems which are economic. Needed especially are data indicating the marginal rate of substitution of forage and grain as product outputs from the land and as feed inputs in livestock production. We need to know the extent to which forage complements grain in the sense that total production (and not yield per acre) of the latter increases as acreage of the former increases and the rate at which the two substitute for each other once forage is expanded so far as to become competitive with grain or other crops. This information should be available under various mechanical practices and for different time periods. Similarly, data indicating the marginal rate of substitution between grain and forage and the consequent effect on the production period is needed for the numerous types and grades of livestock. By com-

bining these data with other price and resource input data, estimates of optimum conservation farming systems would be facilitated. However, information is needed not for two practices, rotations or feeding systems alone, but for all or a number of points over a wide range of the production surface or curve. In the past physical data has not often been available in this form.

Without this cooperative effort, future progress is likely to be slow. The production economist who must resort to farm surveys and records alone is limited by the progress of farmers in adoption of new practices. He can do little to design farming systems which extend beyond the limits which farmers have already gone and is handicapped by the expense and time necessary for proper stratification of his sample. Yet the results of physical research will not suggest the optimum farming system or combination of resources where they fail to recognize the basic production and economic models involved. Too, economic interpretation of a small sector of data by the physical scientist may often lead to erroneous conclusions where it does not relate to the farm as a unit. The worker in farm management or production economics might well initiate effort toward more cooperative research. Unlike most other specialists he is concerned not only with land, capital or labor considered individually but also with the economics of land, livestock, rotations and all resources and production problems as they relate to each other.

Research workers at the Iowa Agricultural Experiment Station have made some important initial progress in cooperative research which should eventually aid in solution of conservation farming systems. The Departments of Agronomy, Animal Husbandry and Economics are cooperating on projects at the Clarinda and Monona experimental farms to determine the rate and economy of forage-grain substitution in beef production. In time this information will be integrated with the results from various rotations and mechanical practices on the two soil types along with supplemental information to aid in suggesting optimum conservation farming systems. These experiments will not complete the inventory of production functions necessary. Still required is knowledge of the marginal rate of substitution of grain and forage for other types and grades of livestock. Fortunately since we have some agronomists and animal husbandrymen who understand and appreciate the economic

models involved, there is possibility of extending this cooperative effort in time.

However, the task is great and is one which might be attacked cooperatively on a wider basis. Production economists, agronomists, engineers and animal husbandrymen might well get together from a number of states, outline the complete range of data needed, and then proceed with a division of labor which would make a larger amount of data available in a shorter time period. Some states might specialize in establishing the marginal rate of grain-forage substitution for several grades of dairy cattle while others investigate the practical range of substitution for feeder cattle, hogs or other livestock. The findings in one state would have general applicability in others. A similar division of effort is also possible in the case of crops where one soil type is common in two or more states. Properly stratified surveys and farm records might be used to supplement experimental data in the case of labor or inputs which do not lend themselves to measurement by means of other research techniques.

First, it might be asked, what right has the economist to think in terms of technological ratios? The answer is obvious. All economics of production or consumption deals with technological or psychological ratios. In Economics as a science dealing with the allocation of scarce means between competing ends, monetary value is simply a common denominator for measuring these physical relationships. Regardless of how defined, economics ultimately deals with equating technological or psychological ratios in one form or the other for attainment of a maximum quantity. Only under these conditions are profits to the business firm, utility to the household or welfare to society maximized. There is nothing improper about the economist's being concerned with these ratios.

Second, it can be asked, is the technical scientist interested in cooperative research? The answer is probably yes and certainly so if the economist initiates some effort in this direction. Historically, there has perhaps been more cooperative research between production economists and technologists as groups than within the field of technology generally. Even then it has been far too little. I leave for you the question of how we get a program of the proper magnitude initiated.

ROUNDTABLE ON FARM TAXATION

Chairman: Norman J. Wall, Bureau of Agricultural Economics

ANALYZING THE TAX LOAD OF AGRICULTURE*

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FROM time to time the Bureau of Agricultural Economics is asked to supply figures that will give a picture of the "tax load" of agriculture in the United States. These requests, which take various forms, come from many different people—editors of farm publications, makers of public policy, students of agricultural economics, and research workers in farm organizations, to mention a few. It is obvious from these inquiries that there is a serious lack of agreement as to what is meant by the tax load. It is hoped that this paper will contribute in a small way to a better understanding of the problems involved in such a concept, even though no happy solution is offered.

An economic analysis of the tax load of agriculture should begin with a definition of agriculture that is appropriate for such an analysis. Is it an industry composed of all farms, or is it a group of people earning a living from farm operations? The distinction between farmers as a group of taxpayers, and agriculture as a sector of the national economy making its contribution to the support of Government, is fundamental.

To be more specific, by Census definition a farm is land used in agricultural operations provided the tract is 3 acres or more in size and its agricultural products in a given year are valued at $250 or more. Thus farm real estate taxes as estimated by the Bureau of Agricultural Economics—which uses the Census definition—are so much per acre of "land in farms." But for statistical computations the exact number of acres must be determined, and so the Census elaborates as follows:

> Land in farms includes considerable areas of land not actually under cultivation and some land not even used for pasture or grazing, but all such land must have been under the control of the operator and considered a part of his farm in order to be counted. However, large areas of timberland or other nonagricultural land held by an operator of a farm as a

* A paper presented at the Annual Meeting of the American Farm Economic Association, Green Lake Wisconsin, September 15, 1948.

separate business, and not used for pasture or grazing, or for any other farm purposes, were excluded. Land neither owned nor leased, but from which crops, including wild hay, were harvested, was reported as part of the farm. When cattle, sheep, or other livestock were grazed, or pastured on land neither owned nor leased by the operator, such land was not included as part of the farm.

Obviously there are grounds for disagreement with the types of land included in the Census definition and so we find some of the States arriving at rates of taxes per acre on land within their borders that differ from BAE figures. Specific measures of the tax load when stated on a per acre basis, therefore, would be affected by the definition used in the computations.

The view of agriculture as a composite of farms is significant, particularly in property taxation, but agriculture as an aggregate of farmers also is important—especially in income taxation. Both concepts require precise definition, but the second raises the immediate question of just who is a farmer and what is included in farm income?

The Census does not define a farmer directly. A "single-unit farm operator" is the person who operates a farm independently. "He directs the operations on the land worked by himself, his family, or hired laborers." There are several classes of operators, such as full owners, part owners, managers, tenants, etc. For Census purposes, the "rural-nonfarm population" is that part of the people who live in communities with concentrations not greater than 2,500 persons.

But determination of the tax load of agriculture viewed as an aggregate of farmers depends upon how still other questions are answered. What is to be done about elderly farm people who have no farm income and who do not work; urban employees who commute to their homes on farms; and professional and other people who obtain their main income from urban employment but who own and even operate their farms? There is also the problem of determining whether urban or governmental investments of farmers should be regarded as sources of farm income.

Tax-rate Concepts

The problems listed above illustrate the problems one faces immediately when contemplating the tax load of agriculture. Now we turn to the various uses of the term itself. Sometimes the tax load of agriculture is spoken of as the absolute amount of taxes

paid by farmers. When so used, some base is selected. If the basis is the assessed value of property, ordinarily the tax load is equivalent to the tax rate. Thus the United States farm real estate tax rate for 1947 was 53 cents per acre or 96 cents per 100 dollars of valuation. Taxes per capita (the poll tax, for example) also may serve to measure the tax burden in the sense of tax rate.

But property tax rates may be poor measures of the relative tax load within States in which the ratio of assessed to true value varies greatly between counties or other local jurisdictions. The same thing would be true in a comparison between States. When the measure used is the ratio of taxes to true or market value of property or wealth, inequalities of assessment are corrected. But as a practical matter, reliable data often are not available. This is particularly true when the tax levy applies to intangible personal property.

When the tax load is thought of as the tax per acre of land in farms, no account is taken of different degrees of improvement of land or of its productivity. Taxes per square mile of total area are significant as measures of taxation when they are related to land utilization. Here, sparsely settled areas are likely to have a low tax rate per square mile but a high tax rate per dollar of value.

An approach commonly employed is to relate taxes to income. Often in such cases, confusion arises because no distinction is made between the income of agriculture and personal incomes of farmers. But this approach is different from the establishment of a ratio of taxes to wealth or property, and it is particularly significant when most of the people are salaried or when incomes are characterized by a high proportion of recurring receipts. If the tax load of agriculture alone is studied, this measure is unimportant unless it is later related to the tax loads of people in other industries—which, because of their many dissimilarities, is not an easy task. But when so used, it is often difficult to obtain accurate data pertaining to personal agricultural incomes. Cash rents, for instance, apply to income from real estate only and the earned income of farmers as entrepreneurs is absent.

Quantitative Concepts

There are those who regard tax-rate concepts of the tax load as superficial and incomplete, particularly when they are considered a measure of burden. They prefer quantitative measurements such as aggregate Federal, State, and local tax payments made by all

farmers in a given period of time, usually a year. In this concept, not only wealth and income, but also farm expenditures play an important part in the technique of measurement, for they are bases for determining, respectively, State and local property, Federal and State income, and Federal and State excise and general sales taxes —to mention a few examples.

In its simplest form, a listing of taxes paid, together with their amounts, would constitute the total tax load according to such a concept. An illustration that might be given, although it was not so-called when published, is an estimate of farm tax payments made in 1930 by Donald Jackson of the Bureau of Agricultural Economics. It is as follows (in millions of dollars):

Real estate	566
Personal property	100
Gasoline	99
Automobile licenses	61
Inheritance	10
Income	8
Poll	6
Total	850

A vast array of new taxes has been added to this list since 1930, and rates for some of the older sources of revenue have been increased so that their earlier positions in the array have changed considerably. One of the "new" levies is the general sales tax which was introduced in the early thirties, and which is now collected in

TABLE 1. STATE TAX COLLECTIONS BY TYPES, FISCAL YEARS 1947 AND 1932

Tax	1947		1932	
	Amount	Percentage of total	Amount	Percentage
	1,000 dollars	*Percent*	*1,000 dollars*	*Percent*
General sales	1,178,849	20.3	7,070	0.4
Gasoline	1,124,397	19.4	534,160	28.3
Net income	878,550	15.2	145,450	7.7
Motor vehicle	540,348	9.3	310,055	16.4
Alcoholic beverage	481,573	8.3	1,368	.1
Property	261,995	4.5	323,477	17.2
Tobacco product	244,767	4.2	15,166	.8
Death and gift	166,352	2.9	149,416	7.9
Other	920,783	15.9	400,366	21.2
Total	5,797,614	100.0	1,886,528	100.0

Adapted from *State Tax Collections in 1947*, and *Financing Federal, State and Local Governments: 1941*, Bureau of the Census. Unemployment compensation taxes excluded.

27 States. Detailed annual estimates of these taxes that are paid by farmers are not available, but their relative importance in State fiscal systems is shown in Table 1 for 1947 as compared with 1932—years for which data are readily available.

It will be noted that general sales taxes were near the bottom of the list in 1932 but that by 1947 they had reached the top as a revenue producer for the 48 States—despite the fact that only about half the States imposed them in the latter year. Also, three States—West Virginia, Michigan, and Washington—obtained over half their revenue from this single source in 1947. As for farmer-payments, it has been said that "Farmers may have paid as much as $50,000,000 annually in State general retail sales taxes in the last few years."[1] In addition, farmers have paid a share of a related group of selective sales taxes to Federal and State governments, and very recently some general sales levies to local governments in some of the States (California and Pennsylvania, for example).

Of the older sources of revenue which have higher rates, perhaps from the farmer's viewpoint the Federal income tax is the most phenomenal. The 8 million dollars paid by farmers in income taxes in 1930 included payments made to the Federal Government and to all the States that imposed the levy at that time. Beginning in 1941 when only 15 million dollars were paid to the Federal Government, these payments rose rapidly to reach a peak of 960 million dollars in 1948 (Table 2).

TABLE 2. FEDERAL INCOME TAX PAYMENTS BY FARMERS, 1941–48

Year	Million dollars	Year	Million dollars
1941	15	1945	725
1942	50	1946	720
1943	425	1947	760
1944	275	1948	960

State income-tax payments made by farmers are relatively much less important than are Federal income taxes. Only 31 States use the tax, and exemptions are high and rates low in comparison with Federal law. It has been estimated that farmers' payments "probably did not exceed $40,000,000 even during the high-income war years."[2] Thus Federal and State income taxes paid by farmers

[1] Gerhard J. Isaac, "Farmers' Taxes," *Agricultural Finance Review*, November 1946, p. 14.
[2] Gerhard J. Isaac, *loc. cit.* p. 13.

probably totaled about one billion dollars in 1948.

Historically, the chief contribution made by agriculture to the support of government was through the property tax. This was due mostly to the nature of the farm enterprise. Land was the principal form of wealth and it was certainly the major source of income to rural America. A large farm indicated that its owner possessed considerable ability to pay taxes. A small one indicated the opposite. Business or personal losses and expenses of farmers played little part in tax calculations. In recent years of big incomes and high tax rates, however, income taxes have superseded in amount, total property levies, although the latter remain the most important single source of revenue for local governments in this country. A large number of the States no longer impose property taxes for State purposes or they levy only a nominal rate.

Over the years, the property tax has become primarily a tax upon real estate (Table 3) and to a more limited extent upon tangible personalty. As agricultural wealth consists largely of such property, it is not surprising that the property tax has continued to be important in the farm tax load. In 1947 farm property levies were $705,161,000. This compares with the previous all-time high of $640,000,000 in 1929 and with a depression low of $420,000,000 in 1934. During the recent war period, farm property taxes fluctuated within narrow limits—quite in contrast with what happened during the World War I period.

TABLE 3. TAXES LEVIED ON FARM PROPERTY FOR SELECTED YEARS

Year	Property taxes levied		
	Total	Farm real estate	Farm personal property
	1,000 dollars	*1,000 dollars*	*1,000 dollars*
1929	640,822	567,493	73,329
1930	638,038	566,956	71,082
1935	430,636	393,878	36,758
1940	445,665	401,780	43,885
1945	554,109	471,181	82,928
1946	616,954	524,621	92,333
1947	705,161	600,161	105,000

The tax load of agriculture, even when used as a quantitative measure, does not end there, however. Automotive taxes paid by farmers consist of licenses and permits and motor fuel taxes to Federal and State govenments. Amounts paid by farmers in recent

years are presented in Table 4. As might be expected, State gasoline taxes declined in amount during the war years when rationing was in force and then rose again. In 1947 they amounted to more than 106 million dollars. Federal fuel oil taxes continued upward during the war, rising from $35.8 million in 1940 to 63.3 million in 1947. Unlike most State gasoline-tax laws, the Federal Government levies its tax on all gasoline used on the farm and not just that used by farmers personally. Licenses and permits cost farmers $58.7 million in 1940 and $90.8 million in 1947.

TABLE 4. AUTOMOTIVE TAXES PAID BY FARMERS, 1940–47

Year	Licenses and permits	Motor fuel taxes	
		State	Federal
	1,000 dollars	*1,000 dollars*	*1,000 dollars*
1940	58,723	79,265	35,850
1941	62,906	81,761	45,382
1942	97,599	76,661	46,034
1943	86,893	72,843	46,556
1944	86,680	74,545	49,080
1945	89,824	82,001	52,765
1946	77,604	95,135	58,209
1947	90,838	106,444	63,329

Many other taxes paid by farmers would have to be estimated if the tax load were looked at as an accumulation of the amounts actually paid into Federal, State, and local government treasuries by farmers. It should be emphasized that the above amounts are only estimates, and that the more important taxes only are included. Further improvements in the statistical processes are constantly made, and for that as well as for reasons which appear below, it seems wise not to set down the various amounts in a single table as representing the tax load of agriculture.

Qualitative Factors in Tax Load

It should be clear from the foregoing discussion that a quantitative measure of "obvious" tax payments by farmers—such as those levied against income, property, or transactions—can go only part of the way in determining the tax load of agriculture. At this point the distinction between agriculture as an industry and farmers as taxpayers again becomes important. A physical sector of the economy does not "bear the burden" of anything, certainly not of taxes. It may have part of the support of government imputed to it. But

the farmer-taxpayer himself, the human being, makes any sacrifices that taxes create. Thus students of public finance are almost unanimous in thinking that, in general, taxes levied according to the ability-to-pay principle are better.

It would appear necessary, therefore, to analyze several additional factors (that may be called qualitative, for want of a better term) if the tax load in the sense of the real burden or justice of taxes is to be determined.

One of these is the degree to which the burden of taxes is shifted to, or away from, farmers. The final word on shifting has not been written but there is general agreement on a number of points. For instance, a farmer who pays an individual net income tax is unable to pass it on, as his prices were determined before the tax was determined. Thus both impact and incidence of the net income tax —that is, the initial burden of the payment as well as the ultimate burden—are at the same point. This is true in the long-run as well as the short-run.

Not so, however, with a general sales tax. Retailers ordinarily are held responsible for the payment of general sales levies, but they raise the prices of their goods to include the tax. In this case the short-run impact is upon the retailer and the incidence is upon the consumer (including farmers, if they buy the taxed articles). But in the long run, the incidence may be upon the producer of the taxed products, either partly or wholly, depending upon circumstances. To illustrate, if food is taxed and prices are raised as a result, the demand for food may decline, the supply sooner or later may be affected adversely, and the ultimate burden of the tax may rest upon the farmer-producer who loses money until he can shift to other lines of production. Of course if a food shortage exists and all that is produced is sold even at higher prices attributable to taxes, this reasoning does not apply with full force. At any rate, the case illustrates that some taxes may be shifted backward as well as forward, and that both producers and consumers may share in the impact or incidence of taxes or in both.

It was said years ago that agricultural economists working in taxation "are inclined to reason that no taxes paid by farmers are shifted. They overlook the fact that there probably is a relationship between the division of ordinary taxes for road support between city and country, and the prices at which farm products in the long run sell in urban markets. They also forget at times the probable

shifting to agriculture of some of the taxes on railroads and industrial property."[3]

Agreement is general that taxes on property which reduce net incomes from it are capitalized and that they thus lower its value. The impact and incidence of such levies are therefore on the present owner, although it is not known how long it takes for land values to adjust to rises in real estate levies.

A second qualitative factor in the tax load of agriculture is the indirect effect of certain taxes. There are tariffs, for example. If a tax on imports completely excludes the product, one cannot say that the tax has been shifted because none is collected. Nevertheless domestic consumers feel the effects of such a duty. Certain nonfiscal revenue measures also illustrate the point. These include levies on bank notes of States (which were 100 percent effective), billboards, alcoholic liquors, and tobacco. To the degree that such impositions are effective, they reduce the demand for these products. Thus farmers who produce the raw materials entering the manufactured products such as whiskey or cigarettes would have the demand for grain and tobacco reduced. This is true despite the fact that the tax may be so high that not a great deal of revenue is obtained.[4]

A third qualitative factor in the tax load of agriculture is the indirect effect that public expenditures have on taxes. To illustrate, the ratios of taxes to real property values may be considerably affected by the nature and extent of public expenditures made with tax payments. A drainage-improvement levy may increase productivity of real estate. If the net income from land is $8 per acre and the property tax is $2, the ratio of taxes to income is 25 percent. But if an improvement costing $1 per acre in taxes is made, and the income of the land rises $1 per acre, the value of the land does not change, although the ratio of taxes to income is raised to $33\frac{1}{3}$ percent. But if the $1 additional tax increases the land product $2, the ratio is changed to 30 percent.

In this case, public expenditures have been assumed to be immediately productive. But if government services contribute to improved living as when they take the form of better schools or roads, net cash incomes may not be increased immediately. Few

[3] "Research in Public Finance in Relation to Agriculture," a report of Advisory Committee on Social and Economic Research in Agriculture, *Social Science Research Council*, Bulletin No. 1, 1930, p. 14.

[4] It should be noted that the difference between the incidence and the effect of a tax (as used here) is sometimes very slight, as shown in the illustration of the tax on liquor and tobacco products.

would argue, however, that the income of an educated community is not greater in general than that found among illiterates. In many cases incomes are directly raised by public expenditures, and in many more present expenditures will result in long-run social and economic development—such as is found in the Tennessee Valley.

Significance of the Tax Load of Agriculture

It has been pointed out that the tax load of agriculture cannot be designated adequately merely as so much taxes per acre, or per $100 of property value, or per $1,000 of gross or net income. Nor is it equivalent to the total amount of taxes paid directly to government by farmers. The tax load in the sense of a burden, moreover, is modified somewhat by the nature of specific and general benefits received by taxpayers from public expenditures.

Unfortunately research techniques have not been developed to the extent required for a precise or even approximate measurement of the tax load of agriculture as many now interpret the term. Considerably more inquiry is needed in this field. In recent years farmers' tax payments have grown enormously, but have they increased out of proportion to those of other taxpayer groups? In other words, What are the relative tax burdens of farm and other groups in the national economy? To answer these and related questions, one needs to explore several phases of taxation much more thoroughly than has been done up to now.

One phase of inquiry might center about the proper allocation of functions between the various levels of government. In those States in which roads and schools are provided for largely or entirely by the central government rather than by local jurisdictions, the tax burden may have been shifted in large measure from property owners to others. Local governments still rely heavily upon property levies but most States depend upon income or sales taxes. Thus the burden of taxes levied for farm roads and schools may be shifted to persons who receive nonfarm incomes or it may be diffused to all taxpayers through a general sales tax.

This possibility is of further significance to the farm tax load. When chief reliance for revenue is placed upon income taxes, tax payments of individuals decline as their income drops. In the past, property levies have not followed this course. They tend to be relatively fixed, or when income and other tax sources dry up, it is possible that property taxes may actually increase, despite a business recession.

Another phase of inquiry might seek to determine whether the ever-growing cost of government is equitably distributed among the various economic groups in the community and among individuals within each group. Highway systems have been improved and expanded. Farmers enjoy these as aids to the marketing process, as well as for personal pleasure. But large concentrations of population also depend upon good roads for fresh fruits and vegetables, among other things. Who should pay for the roads, and in what proportion? Today, school programs are more varied and costly. In the past, rural communities have contributed heavily to the labor force used in urban areas. An educated citizenry makes a nation great in human resources. Who should pay for improved educational opportunities, and in what proportion? Then there are Federal and State conservation, price support, social security, and numerous other programs for rural and other people. Everyone benefits from these public expenditures and everyone pays in some measure. But is the tax load equitably distributed?

An important difficulty in analyzing the tax load of agriculture lies in the fact that some taxes are paid by the farmer as a producer and these are properly included in business expense. Others are paid by him as an individual out of his personal income. Some taxes fall partly in each category. But in making an analysis, these and other difficulties with an analysis should not prove insurmountable. Some day somebody may come up with an acceptable single figure, which will be *the* tax load of agriculture.

DISCUSSION*

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I should like to facilitate discussion by emphasizing three major points concluded from Mr. Haygood's paper. First, an adequate and reliable measure of the tax load of agriculture is needed by makers of public policy, agricultural workers, and other important groups. Second, the scope of work now being done in analyzing agricultural taxes—which consists mainly of the various farm property tax indexes—is not adequate for all present day needs. And, third, the job of measuring the tax load of agriculture is beset with a number of complex problems, involving both principles and techniques, that must be solved before a figure representing the tax load of agriculture will be acceptable.

It is doubtful if any farm tax worker will seriously dispute this summary of the present status of farm tax studies. The greatest contribution of the

* A discussion presented at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

paper has been in defining the problems and relating their significance. Though admittedly few solutions were offered, the fact that the problems have been delineated and analyzed marks a long stride toward a solution.

There is reference to the BAE and the various state farm property tax indexes. Apparently these data are reasonably satisfactory for the purposes for which they were devised. I do think we are inclined to accept them too much as an absolute measure, per se, instead of an indicator of trend and relative levels.

Texas happens to be one of the states that has arrived at rates of taxes within its border differing from BAE figures. The Texas index is weighted by total land area instead of Census figures for farm acreages. It is my understanding, however, that the method used by Texas was not chosen originally on the basis of any particular disagreement with the types of land included in the Census, but rather with a belief that total land area would result in a more significant figure for Texas use. The point is that we each show different figures for essentially the same measure, a fact that indicates the desirability of uniformity and coordinated efforts.

If an over-all measure of farm tax loads is ever attempted on a national scale, general agreement on questions posed by Mr. Haygood should be reached before the states go their separate way on phases of work that may be done locally, either in cooperation with the Bureau or as independent projects.

On the score of quantitative concepts vs. qualitative factors, there seems to be an advantage of expediency in favor of commencing work on an over-all measure with emphasis on the quantitative. Perhaps gradual perfection of methodology on a quantitative basis will give impetus to work on the qualitative aspects.

Considerable emphasis was given in this paper to the factors complicating the qualitative aspects. I should like to mention one additional factor that currently seems to be very pertinent. It is the relationship of incidence and shifting to the point between perfect competition and pure monopoly at which a given industry or entrepreneur is operating. If it is generally agreed that under monopolistic pricing practices an entrepreneur will bear some portion of taxes out of his profits, which under competitive pricing would ordinarily be passed on to the consumer, then how are we to know what portion of a gasoline tax, for example, is passed on to the farmer and what portion is borne by the producing, refining, or marketing people unless the competitive factor is considered.

It was emphasized that the tax load of agriculture could not be measured as so much taxes per acre, or per $100 of property value, or per $1,000 of gross or net income. Further, it was stated that the load was not equivalent to the total amount of taxes paid directly to government, the point being that the burden is modified somewhat by the nature of specific and general benefits received by taxpayers from public expenditures. This unquestionably is true with many types of public services. But for some public expenditures, would it not be confusing two different areas of philosophy to try to modify one against the other. An expenditure for public education is an example.

Public educational services have developed in American government since the first half of the 19th century under a principle that equal oppor-

tunity for a minimum standard of education should be provided for all. That is, public schools are founded and operated under a philosophy and set of principles governing education in a democracy. The revenue to support this service is obtained through the application of principles of taxation, a separate and distinct area of democratic philosophy. The exact relationship between the benefit principle of taxation and principles of education may in some respects be a moot question. So, for practical purposes, it may be necessary to disregard different levels of benefits from services; studies of disparities of benefits would of necessity then be pursued as distinct areas of research.

DISCUSSION*

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One reason, perhaps the main reason, for attempting to analyze the tax load of agriculture is that concepts of tax load are used in formulating tax policy. Tax policy of agriculture becomes a part of general agricultural policy. None of this policy may rest on a firm foundation without an analysis of what the tax load is in terms of its effect on agricultural output and on incomes within agriculture.

The tax load of agriculture has been measured at various times in terms of rates or of aggregates. Such a measurement is largely superficial in an economic sense because no consideration is given to the shifting and incidence of the taxes levied against farmers or farm property or to the effects of other taxes, such as tariffs and public utility taxes, which may be shifted in part to agriculture. The significance of such rates and aggregates moreover depends on the benefits that are received from public expenditures.

Using rates or aggregates in the usual manner, therefore, does not give us a meaningful concept of tax load and provides very little guide to policy. Sharpening our statistical procedure, no matter how necessary in an empirical sense, will not provide us with an answer to the significant problem of policy because the essence of our case will be contained in something quite beyond these figures. It will be found (1) in studies of the effects of various taxes, farm property taxes, income taxes, sales taxes, on resource utilization within agriculture and on incomes received by farmers, (2) in studies of the incidence of taxes levied on corporate income or on nonagricultural property, and (3) in studies of the production and income effects of public expenditures.

The place to start might be in the analysis of the incidence of some tax relatively easy to identify such as the farm property tax. Even here incidence should be considered broadly. To a new purchaser, property taxes may be burdenless because capital values are lowered by the existence of the taxes levied. If aggregate output is as large with such taxes as it would be without them, however, the burden of these taxes may not be shifted out of agriculture and may eventually reduce farmers' incomes over a period of years. The study would have to be rooted in the dynamics of the indus-

* A discussion presented at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 15, 1948.

try because the facts of capital rationing, of yield and price uncertainty, of the general relationships between costs and prices, would help to determine how such taxes react on output. The fact that farm prosperity comes in irregular cycles may be significant. In periods of prosperity, for instance, farmers make some investments which are beyond the long-time income expectations for the resources involved. This leads to an excess of investments in terms of marginal productivity and to a rigidity toward readjustment in low income periods. Under such conditions the incidence of the taxes levied may be on the farmers themselves. If, for reasons of general welfare or for other reasons, this were considered undesirable, tax policy changes might be instituted. If the tax system were changed to exact a larger payment in prosperity and a smaller payment in depression investments might be more in keeping with longer-time income expectations. To effect such a change less reliance might be placed on the property tax and on sales taxes with a greater reliance on income taxes. Corresponding changes might be made in state and local government finance structures. Looking ahead we might see that the income tax should be adapted to fit farm conditions more adequately than is now done. The withholding provision might be tailored to farm use. Farmers could settle their tax accounts with the government at the end of each year and tax liability could be averaged over a period of three or four years. Some farmers might then obtain refunds in low income years. Thus studies of incidence and of tax policy also might help us to solve some of our farm problems which are associated with irregular income.

A second field of survey lies in the realm of industries serving farmers. Railroad property taxes may be used as an illustration. Most farmers probably favor applying the property tax to railroads. We know very little about the incidence of such taxes except that costs in public utility services are reflected in public utility rates and therefore the burden of such taxes is passed on to the users of the services. Part of the property taxes on railroads might be included in the tax load of the people in agriculture. But since such shifting may eventually influence agricultural output part of the railroad property tax burden will be carried by consumers of farm products.

A third field of study lies in an analysis of production and income effects of public expenditures. Eventually this study should go beyond the field of subsidy and income payments to the broader field of public roads, schools, extension service, etc.

I agree with Mr. Haygood, therefore, that analyzing the tax load of agriculture is one of the most difficult tasks we could undertake. We agree that the concept should receive more attention than it has in the past. But rather than seeking to find some single figure which will be quoted as *the* tax load of agriculture and seeking to isolate each tax according to whether it is considered as a cost or is paid out of income, our investigations may become more significant if we seek to discover the production and income effects of various taxes. This may help us to formulate a tax policy which will be consistent with the goals and objectives of general agricultural policy. Rather than speak in the aggregate to the person who wishes to know the tax load of agriculture it might be more meaningful as well to express the load in terms of agricultural output and farm income.

EXTENSION METHODS

Chairman: Tyrus R. Timm, Agricultural and Mechanical College of Texas

AN INTRODUCTION TO EXTENSION ECONOMICS*

TYRUS R. TIMM
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THE Smith-Lever Law of 1914 created as a third basic division of the Land-Grant College, "*Cooperative Extension Work in Agriculture and Home Economics.*" Shortly thereafter forty-seven Land-Grant Colleges and the United States Department of Agriculture signed memoranda of understanding for the joint conduct of the general program.[1] In consequence of these two epic events, the Agricultural Extension Service is usually said to have been born in 1914. This does not mean that there were no agricultural extension programs earlier. In many states there were.[2]

Extension specialists in Agricultural Economics have been an integral part of the specialists' staff throughout the thirty-four year life of the extension organization.[3] By 1920, there were 110 state extension specialists concentrating on various facets of agricultural economics. After losing some ground in the mid-twenties, the staff numbered 204 by 1930. By 1940 it had increased to 236, and in the latest count, made in 1947, the total had risen to 263.

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* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

[1] Today only forty-six states operate under the original memoranda. California was the lone exception in 1914, but later Illinois cancelled its agreement. "The two states . . . work in cooperation with the Department and receive funds just as the others," reports H. H. Williamson, Assistant Director, Extension Work, United States Department of Agriculture. In addition to the states, three territories have signed agreements with the Department.

[2] According to J. L. Boatman, Chief, Division of Subject Matter, Extension Service, United States Department of Agriculture, recently in a paper presented before the Texas Specialists Workshop, " . . . in actual practice, the first agricultural extension worker probably was the American Indian. He taught the Pilgrim fathers how to grow a better crop of corn by placing a fish in the hill with the corn seed." In an address, "The Development of the Extension Ideal in the Association of Land-Grant Colleges and Universities" made in 1944, W. A. Lloyd, Executive Secretary of the Association, said, "In 1907 . . . extension work of some kind was underway in each of the 39 states reporting."

[3] In Texas, the first three extension specialists had the following titles: Specialist in Rural Organization, Specialist in Diversification and Cooperative Marketing, and Specialist in Rural Credit. From the Annual Report, Agricultural and Mechanical College of Texas, 1913–14.

Due largely to new marketing projects, the total is estimated now to be well over 300.[4]

Of the total Extension specialists in Agricultural Economics, thirty-one percent are designated either as Economists or Agricultural Economists, twenty-six percent have titles as Farm Management Specialists, whereas seventeen percent are Marketing Specialists. The remainder have a variety of titles. Among these are Specialists in Land Planning, Supervisors of Test Demonstration Farms, and even a Readjustment Specialist.[5]

Neither uniform statistical reports nor job descriptions are required of State Extension Specialists. Consequently, nationwide summaries of their activities are not too reliable. Yet the official county agent report does provide helpful information in classifying the programs of state and county workers. This report is based only on days devoted to specific projects in a county. According to the report, economic specialists just about evenly distributed their time between farm management and marketing, occupying the remaining time (less than 10 percent of the total) with "General Economics."[6]

No information is provided in official reports to gauge properly the amount of Extension work in the challenging field of *public policy*. A survey indicates, however, that the Extension Economics

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[4] Reported by L. M. Vaughn, Extension Economist, Extension Service, United States Department of Agriculture, August 17, 1948. Vaughn cited other related facts: "There was practically a doubling of Extension Economists between 1929 and 1930. . . . These figures do not include the expansion and contraction which took place from 1938 to 1942 under the name of program planning and land use planning. This group represented a high of about 100 specialists in 1940. While this work was largely under the supervision of Extension Economists, it was not thought of as a subject matter project."

[5] *Workers in Subjects Pertaining to Agriculture in Land-Grant Colleges and Experiment Stations*, Miscellaneous Publication No. 625, United States Department of Agriculture, July, 1947.

[6] County Extension Agents annually report the number of days that they devote to the various fields of work and the number of days that specialists spend in the county on specific assignments. Of course, there are many hazards in such a reporting system. For example, days devoted to marketing do not necessarily mean the *economics of marketing*. Furthermore, it is probably an understatement to say that about 8 percent is all the time devoted to *outlook*. There is no doubt a tendency to report as outlook only the general meetings called for that purpose. Much of the outlook work is doubtless included, particularly in connection with commodity meetings, under marketing and distribution. The table below is from the 1947 Annual Report for Extension work in the United States:

staff devoted some twelve percent of its time to problems in this area.[7]

The survey also considered the distribution of the Agricultural Economics staff as to Resident Instruction, Research, and Extension. Forty-four percent of the staff members were in research, thirty percent in extension and twenty-six percent in resident instruction.

Public policy receives more attention in terms of man months in resident instruction than in research or extension. As to farm management and marketing, there are more staff members in research and extension than in resident instruction. As compared with extension, research leads in the number of the staff working on farm management and marketing projects, but extension gives more

DAYS DEVOTED TO FARM MANAGEMENT, GENERAL ECONOMICS, & MARKETING IN THE COUNTIES—UNITED STATES, 1947, AS REPORTED BY ALL COUNTY AGENTS (HOME, 4-H, AND AGRICULTURAL)

	By State Extension workers		By County Extension workers	
	Days	Percent	Days	Percent
Farm Management	7,457	47.3	92,201	45.0
General Economics	992	6.3	19,846	9.7
Marketing and Distribution	7,306	46.4	92,642	45.3
Total Days	15,755	100.0	204,689	100.0

OUTLOOK INFORMATION SEPARATE FROM ABOVE CHART

	By State Extension workers		By County Extension workers	
	Days	Percent	Days	Percent
Farm accounts, individual management problems, farm credit, etc.	6,106	38.7	75,483	36.8
Outlook Information	1,351	8.6	16,718	8.2
Total Farm Management	7,457	47.3	92,201	45.0

[7] This survey was made through questionnaires in March, 1948. Thirty-four states reported. Those states *not* reporting were Alabama, Colorado, Delaware, Georgia, Idaho, Massachusetts, Minnesota, Montana, New York, North Dakota, Oklahoma, Tennessee, Wisconsin, and Wyoming.

attention to public policy.[8]

Another matter of interest is the administrative relationship of Extension specialists to members of the staff serving the other two divisions. This relationship is difficult to summarize. The following information from Mr. Vaughn of the Federal Extension office, however, is enlightening:

"After talking with others here, and after arbitrarily placing a State in one of three categories, they run as follows: About 18 states operate with separate Extension set-ups; 18 as Departmental units; and 12, for all practical purposes, function as Departmental groups, but have separate identity. I would like to add that in giving you this summary, there were a number of states that could have been placed in one group about as easily as another. There were others who were changing their set-ups and are now in sort of a transitory stage."[9]

The chairman recognizes that he has given only a general picture of extension personnel and programs within the framework of Agricultural Economics. It is not a fixed setting but a dynamic one. This brief summary at best is only a "reading" on a very active and widely dispersed venture in mass agricultural education.

The recognition *extension work* is being given at this annual meeting of the Association is another step up the professional ladder for Extension Economists. Many in and out of Extension have been inclined to feel that in the years past, Extension specialists have not contributed to the program of the Association, or shared in the

[8] Ibid. See table below for ratios computed from the 34 completed questionnaires received:

RATIO OF AGRICULTURAL ECONOMICS STAFF IN RESEARCH AND EXTENSION AS COMPARED WITH RESIDENT INSTRUCTION

Division	Farm Management	Marketing	Public Policy	Other	Total
Res. Instruction	1.00	1.00	1.00	1.00	1.00
Research	2.17	2.45	.57	1.01	1.74
Extension	1.55	1.59	.69	.51	1.16

[9] Part of a letter received from L. M. Vaughn, Extension Economist, Extension Service, United States Department of Agriculture, Washington, D. C., August 17, 1948.

confidence of its leaders, as they should. This roundtable provides the opportunity for erasing such misgivings.

Extension Specialists in Economics, to use the vernacular, *have come a long way*. And to my mind, there is an attendant corollary—*we have come up the hard way*. Extension administrators have been drawn largely from the physical sciences.[10] In the development of a well-rounded program in Agricultural Economics, resident instruction led the parade, followed by research, with extension as a late starter. There was the trying task of winning professional prestige from fellow scientists on the one hand and in the eyes of the "dirt farmer" on the other.

Today, our discussion centers on Extension Methods. There can be no more important topic. The significance of this is reflected in the stacks of un-called-for bulletins written by some specialists indifferent to proper methodology. Farmers noisily leaving during a community meeting, as occasionally happens, is further evidence of the importance of sound methods to effective Extension programs.

In view of the importance of methodology, four well-qualified Extension Economists have been asked to discuss significant phases of useful techniques in four Extension programs. These are agricultural policy, marketing, farm management, and economic principles.

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[10] In twenty-two states there are one or more Extension administrators who have held appointments as Extension Economists or who have done graduate work in Economics leading toward advanced degrees. Among these are H. R. Baker, Assistant Director, Arizona; C. O. Youngstrom, Assistant Director, Idaho; T. P. Cooper, Director, Kentucky; H. C. Sanders, Director, Louisiana; W. A. Munson, Director, Massachusetts; and H. A. Berg, Assistant Director, Michigan. From a report prepared by Z. L. Galloway, Extension Economist, Extension Service, United States Department of Agriculture, Washington, D. C., September 7, 1948.

Of course, social scientists are extremely fortunate in having Director M. L. Wilson as the national head of Extension work. He is not only internationally known for his work in agricultural economics and rural sociology, but his general guidance and unswerving interest and confidence have helped tremendously throughout the nation in securing expansion and improving the Extension programs geared toward the *economic life* of the farmer.

USEFUL TECHNIQUES IN AN EXTENSION PROGRAM IN AGRICULTURAL POLICY*

J. Carroll Bottum
Purdue University

AGRICULTURAL policy decisions depend not only upon economic factors but also upon one's philosophy of the function of government and the national and international political environment in which we are operating at any given period. For this reason, the approach made to problems in the public policy field becomes particularly important as well as the techniques used. Public policy questions do not lend themselves to precise answers. There are usually a number of alternatives depending upon the assumptions made. They, likewise, often deal with areas concerning which the farmer does not have first hand experience and knowledge.

It is particularly important in this field that the educator makes clear his assumptions and so conducts himself that he does not appear to have a bill of goods to sell because of either his personal beliefs or political bias. His approach must be one of working through the problem and analyzing the various alternatives to see where each may lead. Insofar as possible, the principles and illustrations should be drawn from experiences of the participants. Just as we go to the margins in our economic theory we must go to the extremes in illustrating points in public policy. For example, a proposal to support the price of buggy whips at 90 percent of the 1910–14 parity helps illustrate a principle that may be more difficult to see when applied only to agricultural products.

Timing is particularly important in doing work in this area. Information on public policy questions should be gotten out ahead of the time when the decision is being made and positions have been taken. Yet, educational work can not be done on particular issues too far in advance when there is no interest in the issue.

Because of the controversial nature of the problems involved in agricultural policy, they can best be presented to small groups where there is ample opportunity for full discussion. Therefore, as the first technique, I should like to suggest the discussion approach. As a basis for the discussion, factual tables and charts illustrating

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

the problems and principles involved may be effectively used. It is desirable that the sources of all data be clearly given so that if anyone questions the data it may be readily checked. Needless to say, the most reliable and respected sources in the eyes of the group should be used. In the use of such handbooks in Indiana we have avoided written interpretation of the data other than certain factual statements. In most states there are local or township groups associated with the farm organizations or other organizations which meet regularly. In certain instances materials have been prepared along the agricultural policy line for these groups to use as the basis of their discussion. The discussion is then handled by the local leader. We need to provide the materials and help create the environment for self-education in the policy area.

The larger meeting where the lecture method is used has its place in an educational program in agricultural policy. However, its usefulness in this field is more limited than many other fields. In the present stage of development it appears to me more desirable to work with the Agricultural leaders. This may be at the county level or at the state level. Public forums on a state basis or a district basis where authorities in the various public policy fields may be brought together have proved a useful technique for extending information in public policy.

The distribution to leaders of circulars, bulletins, and talks by prominent individuals taking different viewpoints may be used effectively. Here again, every effort must be made to bring together the different viewpoints so that the materials sent out do not appear as one sided. The "Agricultural Policy" quarterly published by the Iowa State College Press meets a real need in this area.

Extension personnel may make a contribution working directly with committees, farm organizations and groups who are taking definite positions or making definite recommendations in connection with the agricultural policy. In this capacity, the specialist must be careful to recognize that his function is one of presenting facts and interpreting them to the group he is assisting rather than allowing himself to be drawn into taking a position and in helping make the decision that should be followed.

Movie films may be used to get across certain general ideas. The picture "Round Trip," prepared by the Twentieth Century Fund, is probably a good example of a film in this field which has helped people to understand some of the problems of international trade.

Featured articles in agricultural weekly and monthly publications may be used to a limited extent.

One of the necessities for developing an extension program of agricultural policy is a more thorough understanding by the county agricultural agents of the problems involved in agricultural policy and the importance of working in this field. This training may be done at district county agent conferences, at annual conferences and through special courses. Coupled with this must be a stepped-up research program in the policy field.

Educational programs in agricultural policy are relatively new among the extension activities. Problems in this area, however, are becoming increasingly important to the farmer. The extension service job is to help the farmer with his problems. Therefore, this is an era in which we must give added service. In so doing we must obtain the confidence of those with whom we are working in regard to our objectivity. This means we must avoid the sensational and not attempt to move so fast on any issue that we appear to be advocates of a certain program. Education is relatively slow in this field as in all fields, but if we build it soundly I believe farm groups and farm people will come to have the same confidence in our analysis of problems in this field as they now have in the production, the farm management, and the outlook fields.

USEFUL TECHNIQUES IN AN EXTENSION MARKETING PROGRAM*

L. F. STICE
University of Illinois

THE most obvious approach to a discussion of this topic would be to list and evaluate the teaching methods most commonly used in extension and to illustrate how these have been used in certain marketing projects. Certainly the effective use of market tours, radio, written materials, meetings, and discussion groups could be discussed by extension workers with profitable results. At present, however, I am more concerned with what has been termed "approaches" to doing extension marketing work rather than with specific teaching aids.

Because of the numerous phases of marketing work which need attention, the specialized problems for particular products, and the different groups of people involved, the major problem for most state extension marketing economists is to decide how they can most effectively use their time and resources. The Extension Service is responsible for an educational program in marketing which in part includes: providing and interpreting market news and outlook information; organizing and guiding farmer cooperatives; extending and improving grading and inspection services; promoting programs to increase the consumption of agricultural products; keeping producers, processors, distributors, and consumers informed as to the economic significance of new developments in processing, packaging, and merchandising; and providing information to handlers and other market intermediaries on methods of improving operating efficiency.

More specifically the problem is to develop procedures for reaching and working with the various groups of people, i.e., producers, handlers, and consumers. From my own experience I am led to believe the most effective approach is, first, to gain the confidence and respect of those actually engaged in carrying out the marketing processes. We gain this confidence, are called upon for help in solving acute marketing problems, and are in a better position to initiate long-time improvements only if we are thoroughly familiar

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

with conditions peculiar to each commodity. In business parlance, an extension marketing economist must build up a "clientele" of people who are interested in a particular commodity or marketing problem. Unless the extension worker is considered somewhat of an authority in specialized marketing subject-matter, he is not likely to have a very large "clientele."

Obviously, it is not possible for one extension marketing economist to be an authority in several commodity fields. And in states where there are only one or two people in extension marketing a more general approach is almost essential.

Our situation and program in Illinois may illustrate both approaches; i.e., the commodity and service approach and the general economic approach. At the College we have teaching and research specialists in each of four commodity fields but only two men in extension marketing. The two persons with extension appointments have had the major responsibility for outlook and agricultural policy projects and have had little time for work along commodity and organizational lines. In addition to our College staff there are several well-staffed farmers' cooperatives operating in the important commodity fields. In general, the personnel of these organizations have taken care of the promotional and specialized service needs.

Under these circumstances we have felt our major contribution should be to provide farmers, their leaders, and trades people with factual economic information which would guide their policies in developing new programs and adjusting methods of operations. More often than not, requests for this type of assistance come direct to the person in the teaching and research who is specializing in the commodity with which the people are concerned. The extension staff has frequently helped with investigational studies which might be needed to answer specific questions or to point out desirable adjustments in marketing procedures.

Participation in these studies by the extension economist has not only increased his knowledge but has also provided a valuable contact with farm leaders and trades people which later has been useful in the conduct of broader projects.

Our present program is grain elevator management training illustrates this point. Because of contacts made in grain elevator studies and surveys, we were able to get the country grain trade, both independent and cooperative, to co-sponsor this program. As

a result of their participation, we believe the type of instruction has been superior and the general success of the program greater than it could have otherwise been.

As specific projects have led into more general programs, likewise general educational programs have given us the opportunity to work with leaders on specific commodity problems. Our fall livestock outlook meetings are an example. They are planned and participated in by the Departments of Agricultural Economics and Animal Science of the College, the Illinois Agricultural Association, and the cooperative marketing agencies serving the state. Largely because of this project we attend quarterly meetings of managers and directors of these cooperatives where livestock marketing problems are discussed. Thus we have a medium for keeping in close contact with developments and an opportunity to work on specific phases of livestock marketing which need attention.

A somewhat different approach in extension teaching was used several years ago with some success. The Department of Agricultural Economics held a series of agricultural economics study school for farmers at the county level. Reference and discussion outline materials were prepared and placed in the hands of those enrolled prior to the meetings. The topics dealing with marketing were "Basic Facts about Marketing," "Basic Facts Concerning Cooperative Marketing," and "Increasing Efficiency of Marketing." Because of the increasing demands on our time from other projects we discontinued this project during the war. It is significant, however, that after ten years we still have requests from individual farmers for these schools.

In summary, I believe the most effective extension teaching in marketing must be done with leaders and agencies who are occupied with day to day marketing problems. We can only gain and maintain the confidence of these people and have the opportunity to advise if we are well informed along the lines in which they are interested. Once we have this confidence we are in a position not only to render invaluable service in an advisory capacity, but we can also obtain information which is essential if we are to suggest improvements.

USEFUL TECHNIQUES IN AN EXTENSION PROGRAM IN FARM MANAGEMENT*

Z. L. Galloway
U. S. Department of Agriculture

FARM management extension as it is carried on in the States today is broad and diverse. It includes educational work on farm management phases of farm planning and county planning, farm records and their analysis, enterprise records, farm surveys, farm business problems, farm labor utilization and efficiency, farm tenure, economic information and outlook, statistical information service to State and county extension workers, farm finance, land utilization, and national policy and economic forces. The problem of keeping up to date and abreast of new technical developments in the subject matter field as well as in educational procedure is an important part of the specialist's assignment.

Numerous techniques have been used in carrying on extension programs in the broad field of farm management. Some of them have been very effective; others not so effective. Our need now is for techniques which will reach a maximum number of people with the limited amount of trained personnel available. Training of agents and farm leaders has materially increased specialists' efficiency in some States where definite attention has been given to this angle of the work.

To be more effective in our farm management education, we must endeavor to make the subject matter simple and interesting rather than complex, confounding, and confusing. We must spend more time, whatever the technique, thinking about our audience and its level of understanding, and then prepare our material so it can be understood by that audience.

In the time available to me, I would like for us to take a look at some of the teaching techniques used in farm management which have proved or promised to be more effective in reaching farmers. In order to save time, point up the discussion, and possibly be more specific, let us take a recognized farm management problem and examine a few of the extension techniques which may be used effectively in the teaching process. I think the problem of proper land use will serve our purposes quite satisfactorily.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

In order to generate interest in the problem and suggest possible methods of solution, the illustrated lecture may be used effectively. It makes use of slides, models, charts, and other means of illustrating the ideas presented, in terms which the audience can understand and appreciate. Color slides from local farms are more effective; however, charts, graphs, and diagrams can be used to good effect preferably by photographing with appropriate settings. Brief mimeographed notes or some printed summary of the lecture content which may be handed out at the close of the discussion, are helpful as take-home material.

Group discussion also may be used to increase interest in the subject, develop a feeling of need, and a desire to do something about the problem on the individual farm. This technique has been used in a limited way by extension workers for many years. It is doubtful, however, if its full possibilities have been realized in the field of farm management. The process is based upon the fact that everyone likes to talk and express himself or at least ask questions. In farm management its value also is based upon the fact that operating farmers have experience and information of value to their neighbors and the further fact that all wisdom in the field is not resident on the college campus. The type of procedure used in conducting the discussion is not too important. It is important to organize the group so that everyone has an opportunity to hear and be heard, to express his opinion, and to disagree with the other fellow. There are, of course, recognized principles for effective group discussion which should be followed for best results.

The many forms of written or printed material, from circular letters and news stories to bulletins, may be used to generate interest or to give specific information about our problem of proper land use. Handled with skill, the written word can be effective in farm management education work. Too often, however, we have failed to give full consideration to the readability of our writing. We have written with our fellow workers in mind rather than the farmer and his family.

In our extension readability unit in Washington we have been measuring the reading difficulty of our extension publications to find out whether they are pitched at the best reading level. While economic material is probably among the most difficult to write for easy reading, some of our extension economists have succeeded

in doing just that (EXHIBIT of State extension publications on economic subjects rated average reading level or below). The important thing is to consider your potential reader and his reading ability, and prepare your material so he can read it with ease. Many of you are familiar with the study made by *Wallaces' Farmer* which indicated that "plain talk" increased readership 45 percent to 56 percent.

The farm tour is another teaching technique which we may use effectively in connection with our problem of proper land use. It is a most effective method of teaching farm management facts when properly handled. While we know many elements of success of farm tours, much remains to be learned about the most effective methods of planning and conducting them. In some States extension econo mists have had success in tying in a competitive angle to add interest. In a current publication on Extension Methods, the Montana Extension Service, for example, devotes seven pages to effective methods of handling tours.

In connection with our problem of proper land use, the method demonstration may be used effectively. In open weather the demonstration can be made on the farm where the various soil types or land use classifications can be pointed out and the best methods of rearranging farm layout to secure good land use can be discussed. During unfavorable weather proper land use can be demonstrated, not so well, perhaps, with the use of a farm map, kodachrome slides, and other visual aids in a comfortable room. While careful plans must be made in advance, the method demonstration has great possibilities in the field of farm management as a substitute for the straight lecture. It is calculated to show the listener how to do the job step by step, let him ask questions, and possibly do the job himself for his own farm.

Work forms which the farmer can use in thinking through his problems must be developed for use in the demonstration if it is to be effective in most farm management teaching jobs. Often the make-up of these forms is the most significant factor in the success of the teaching process. In our problem of proper land use, for example, the skill with which the work forms are prepared and presented determine in large measure the amount of learning taking place. Likewise, in the farm management phases of farm planning the construction of the forms used is an important element in the

success of the educational processes taking place and in the portion of the plan carried into action. Thus working forms become an important teaching device in this field.

The result demonstration also may be used advantageously to inform farmers about proper land use, the results that can be expected, and to move them to action. For many purposes in farm management education this technique can be used best in connection with the farm tour. Thus organized groups of farmers can observe the results of improved farm organization and management. In the past much of our extension teaching in effective farm organization, farm planning, farm layout, farm labor utilization, farm records and the like, has utilized this technique. There are, however, further opportunities for increasing the effectiveness of this accepted extension method in the field of farm management. We need to keep in mind that from an educational standpoint the result demonstration is useful only as a means to an end and not as an end in itself.

While I have used this one problem of proper land use to bring out a few of the teaching techniques useful in the farm management field, these same techniques can be used effectively with other phases of farm management education. I realize, of course, that I have not mentioned many of the educational techniques which are useful in the field of farm management.

USEFUL TECHNIQUES IN AN EXTENSION PROGRAM IN ECONOMIC PRINCIPLES AS APPLIED TO AGRICULTURE*

WALLACE OGG
Iowa State College

I BELIEVE it is generally recognized in adult work that we do not have a program of teaching principles as such. We teach principles related to a problem as we study the problem.

Let us begin by a brief consideration of the economic principles that apply to agriculture. In general, we may say that wherever the necessary resources are scarce and there are competing ends to be maximized from the use of these resources economic principles apply.

The important tools for the analysis of problems in farm management are those supplied by economic principles. Given sufficient information these principles could give us mathematically exact answers. In lieu of this information they form the basis for judgment about what size, in terms of resources used, the business should be; allocation of resources between the enterprises on the farm; and the practices that are consistent with the limited resources. The theory for meeting the problems of price and production uncertainty are much less precise but do serve also as guides to judgment.

In home management also the really significant problems can only be analyzed in the framework provided by economic principles. The problem is a maximum of family satisfaction from various family goals, like health, security, and community participation. The scarce resources are income, family skills, time, and the inventory of things the family has for living.

Also in the area of public policy economic principles are an important tool for understanding and analysis. Price policy, trade policy, the problems of congestion of underemployed people, to mention only a few, all require for analysis economic principles. The problems of inflation and employment, so important to agriculture because of their effect on price instability, may be understood only by using the tools furnished by the general theory of expenditures and their effect on employment of resources.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

To teach farm people the things we are interested in teaching them it is necessary that we teach these principles and their application. It is no easy task.

The question is, how can we do it?

There are two alternatives I should like to mention. The first is in general use. The second I should like to propose for consideration. The first is to make no explicit reference to the principles but to illustrate them, hoping to teach the ideas from our illustrations.

The second is to state the relevant principles as simply and clearly as possible, then to relate all of our illustrative material to the principles. This technique runs the risk of frightening people. They may feel we are too abstract and we may lose them at the start. Limited experience does not, however, justify this fear.

An important consideration in how to teach principles is to whom should we teach principles? May I suggest a priority rating?

We should begin at home. We ought to see to it that our own staff has a thorough understanding of the principles.

Second in the priority scale is teaching the principles to our production specialists; then, in order, to our county extension staff; to county and state volunteer leaders, and, finally, to the rank and file.

We have had some recent experience at Iowa State in teaching all these principles to all of these different groups and the results have been encouraging.

We recently added to our staff in economics a man with his graduate training in Animal Husbandry and with very little training in economics. We think we are on the way to making him into an economist well founded on economic principles.

Two years ago we tackled the job of teaching the general theory of expenditure and employment to a group of state and county farm leaders in one two hour session. They liked it well enough to ask for a similar session once a month.

We have tried teaching the theory of the firm as background to farm management with numerous groups of farmers, specialists and county agents. With one farm group we deliberately pitched it at a level we thought they might have trouble following to see what could be done. Two months later the county agent called on us and quoted several people as saying that that meeting grew on them. It dealt with the real problems. They asked him to have us back for more.

We are convinced that rather difficult principles can be taught, as principles, to any of these groups if they apply to problems in which they are interested. We believe that by so teaching principles we can eliminate confusion and teach our subject matter for clearer understanding.

RESEARCH METHODS

Chairman: Warren C. Waite, University of Minnesota

RESEARCH IN PUBLIC POLICY*

WILLARD W. COCHRANE
The Pennsylvania State College

I.

WHEN Warren Waite asked me to prepare a paper for these meetings on the subject of research in public policy, I accepted readily for I have a keen interest in this field of work. But when I began to write I found it exceedingly difficult to know where to begin or what to say. There seemed no accessible handles by which to come to grips with the problem. I made little or no progress until I asked myself the specific question and tried to answer—what do we mean by research in public policy? They by the process of eliminating untenable definitions I arrived at a definition of research in public policy which seemed to be workable.

Research in public policy, it seems to me, must mean *that analytical work concerned with tracing the consequences of pursuing a given policy.* Public agencies, in their pursuit of a given policy, cannot help but create stimuli—stimuli which set in motion forces or sequences of events, which have ultimate consequences. And since we are economists it may be assumed that we are concerned primarily with economic consequences. Although the economist may on occasion be called upon to serve as a generalist or to contribute to a general project which seeks to trace *all* consequences which flow from a given stimulus, for too great specialization in this field can confuse rather than aid the policy maker who must be concerned with the whole gamut of ends, values and interests.

At this point it does not matter whether a given policy involves action of a positive nature or the absence of action. The failure to act can serve, just as potently as action itself, to set up interactions having ultimate consequences to some or all of us. Further, for purposes of research the policy action employed as economic stimulus may be historical, current or assumed; an analysis stemming from a postulated stimulus may prove more useful in this policy field than a historical one.

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

To illustrate research along the lines discussed above let me cite three examples from an extremely limited field. The first and most comprehensive is the study made by Nourse, Davis and Black under the auspices of The Brookings Institution in 1937 entitled *Three Years of the Agricultural Adjustment Administration*. The conclusions of this study are not as sharp as a person seeking counsel might desire, as there does not appear to have been complete unanimity among the three authors. Nevertheless, it is a good example of a full-blown research job in public policy where the researchers appraise the consequences of a given program in American agriculture. Some years later Professor Schultz and O. H. Brownlee at Iowa State College in a bulletin entitled *Effects of Crop Acreage Control Features of AAA on Feed Production in 11 Midwest States* did another job on the Triple A. Their study is not so comprehensive as that of Nourse, Davis and Black but it is more precise in nature, makes greater use of quantitative information, and comes out with sharper conclusions. The consequences of crop control on feed production are clearly shown. To cite one more example, O. H. Brownlee in the JOURNAL OF FARM ECONOMICS, February 1948, in a short article entitled "Marketing Research and Welfare Economics" does, it seems to me, an exceedingly good job in a purely qualitative way of appraising the policy consequences of the Research and Marketing Act of 1946. Here the author, despite some fancy economic "lingo," traces the policy consequences of the act in terms of income expectations in a way that should give pause to those responsible for the administration of the Act.

Too often we do not get this latter type of research in public policy. Rather, we get policy statements of an editorial nature. This is not to argue against the presentation of informed opinions. In absolute terms I think all too few statements of this type have been prepared by qualified agricultural economists. The older men in our field who have had much experience in research and with the workings of action programs owe it to the public to make personal statements on agricultural policy. But let me hasten to add that statements of opinion need not and should not become the exclusive field of elder statesmen. Otherwise this paper would never have been prepared for it too represents a statement of opinion on policy.

Now that we have paid our respects to opinion writing, let us not, in our zest to present a case, particularly on broad national issues

that are not easily managed in an analytical way, confuse an informed opinion with research in public policy. By research in public policy we mean a study of the economic consequences flowing from actions taken (or considered) in the pursuit of a given policy; unfortunately rigorous research of this type has been a rare product in our field. Hence, this paper represents a plea for more research in the economics of agriculture which has as its subject matter the consequences of public action.

II.

In the field of agricultural economics it would seem that research in public policy is most often assumed to be the proper domain of government—particularly the Federal Government. This follows, I guess, from the fact that the Federal Government, over the past two decades, has pursued policies in agriculture involving many and varied action programs. But the plain facts are that the Federal Government, with its many agencies concerned with agriculture, is a poor and illogical place in which to carry on research in agricultural policy. Moreover, little intensive analytical work concerned with policy and its consequences does actually get done in the government. And if we reflect for a moment on the function of government, I think it will become clear why government research agencies cannot easily and readily do research in public policy. The Federal Government is organized and administered by political organizations or groups owing allegiance to countless and varying interests. A political group comes into power by promising to carry out certain policies and remains in power so long as the policies which it does pursue satisfy a coalition of forces which can maintain it in power. Thus it is illogical to expect a political administration to conduct research in the field of policy which may prove damaging to itself. I am not saying now that a political administration as it exists in the United States Department of Agriculture is not concerned with policy; on the contrary, policy is its principal concern. The compromising of special interests to mold a policy which will command the support of a dominant coalition of forces is the major activity of a political administration.

But to return to research work in the U.S.D.A.; research work in the field of economic policy more often resembles a legal brief than the product of a professional economist. The policy research that takes place in the Federal Government is more often concerned

with the support or defense of a policy than with an analysis of its consequences. Here, then, is the problem of conducting policy research in government. The party or group in power must of necessity be prejudiced in its own behalf. Consequently it must demand that research in policy be conducted in such a way as to support it, not detract from it.

There are exceptions of course. There are certain men in the Federal Government that all of us know who are so interested in policy and are endowed with such creative talents that regardless of the situation or the demands of politics they will do research in policy in the sense developed here. Also, there are periods in the development of new policies or new agencies or new programs, usually early in their development, when the administrator consciously seeks unprejudiced analyses of the economic consequences of this policy or that. But these are the exception. The norm, in the field of policy research, is that of producing reasoned arguments to support policies already formulated through political compromise.

What, then, should we expect in the way of research from governmental research agencies? On the basis of past experience and the logic of the argument developed above I would say that economic research in the government, and in this case the U.S.D.A., must be primarily concerned with the *measurement* of economic phenomena. The federal agencies have demonstrated their ability many times over in the collection of statistical material, in its assembly and refinement, and with the final descriptive measurements of economic activity. The federal agencies concerned with agriculture have the funds for the costly collection of statistical data; also, this type of research activity avoids the nasty distribution implications of political significance so often associated with economic analysis and almost always associated with policy analysis. Hence, I am inclined to believe that concern with economic measurement will dominate government research in the future as it does at present.

This brings us to the role that Colleges of Agriculture in the Land-Grant Institutions should play in the field of policy research. I would argue that in the past research in policy has by and large been neglected in the State Colleges of Agriculture. The typical research project in the typical Department of Agricultural Economics is concerned with a non-policy problem within the State. Very often these projects involve a brief survey, some analysis of the information gathered, and the presentation of conclusions or recom-

mendations. With this I have no basic disagreement. But I would argue that a larger proportion of land-grant research resources be oriented toward research in economic policy.

Perhaps the State Colleges of Agriculture have felt that the proper place for research in public policy is in the Federal Government where the formulation of economic policy and its execution are largely carried out in the field of agriculture. If this is the reason for neglect in the field of policy research I hope sufficient argument has been presented to indicate the fallacy of such thinking. Perhaps the cause of the neglect stems from the fact that research projects in the field of public policy are considered difficult to formulate and not easily manageable—that research in public policy does not lend itself to the rigorous type of analysis usually associated with scientific work. If that is the cause of the general neglect I hope that an adequate methodology will be developed later in this paper to eliminate that cause.

As with all generalizations, there are exceptions. Certain of our Colleges of Agriculture have, in well-defined periods of their history, taken a keen interest in public policy, e.g., Cornell, Wisconsin, Minnesota and Iowa State. And I am convinced that it was the concern of those institutions with public policy, even though research in the sense defined here may have played a small role as compared with the preparation of informed opinions, that made those institutions great and influential in our field. Further, a certain amount of rigorous research in public policy has, over the past two decades, been going on in private institutions. Considerable research effort has been concentrated in the field of agricultural policy at the Universities of Harvard, Chicago, and Stanford and The Brookings Institution. And there is every reason to believe that such work will continue. Thus, a slender but nevertheless important work has been going on over the years.

Only two difficulties arise with the work that has been done in the past: (1) there has been too little of it, and (2) there has been a tendency to confuse precise analytical work in the field of public policy with statements of an editorial nature based on value judgments. To overcome the first difficulty, it is obvious that more importance must be attached to this type of research and more resources devoted to it. But to overcome the second difficulty, notably the tendency for research in public policy to take the form of editorial statements at best or to degenerate to the level of bar-room

arguments at worst, it seems necessary to spend some time on research methodology.

III.

I have repeatedly emphasized in this paper the role of consequences in policy research, perhaps to the point of boredom, but I hope not. I have placed strong emphasis on the consequences of action in policy research for two principal reasons: (1) it is the only way to introduce rigor and precision into policy research, and (2) the presentation of information in the form of the consequences is an effective technique for aiding policy-makers in the formulation of policy, and for helping the man in the street to choose between different policy alternatives.

As the mechanism of government becomes more intricate because of countless interventions in the operating economy, and in our case the agricultural segment of the economy, all of us, the legislator, the administrator, the farmer, and the consumer, become more in need of some way of appraising actions taken by government. We need more than the platitudes of politicians, more than the prejudiced arguments of special interests, and more than the informed opinions of public-spirited individuals or agricultural economists. For a given policy or program may be good in one context and a positive evil in another; may have beneficial effects in one period and work havoc in another. Probably in every case the consequences traced out and defined, and measured quantitatively if possible, will disadvantage some and favor others. But if we know who it is that is being disadvantaged and to what extent, and who it is that is being favored, and to what extent, then the policy-makers will be in a better position to redirect present policies and formulate new ones.

This line of thought is not new with me. Most of the ideas presented here—particularly those that emphasize the consequences of policy actions—have been stated before and in a more eloquent manner by Joseph Spigelman in a series of articles running from July through September, 1946, in *Harper's Magazine*. To quote from Mr. Spigelman's article of August, 1946:

> "... No policy, no plan or program, no proposal for action, is wrong in itself so long as it is intended to satisfy positive needs and not merely to harm other people. What is wrong is the effect of satisfying these needs upon the satisfaction of other needs. Government regulation, for example,

is wrong not because of irrelevant abstractions adduced by the theorist, but only to the extent that it impairs freedoms actually valued. A subsidy is wrong, not for itself, but only if it disadvantages those not so favored or if it proves ultimately disadvantageous to the recipients themselves. What alone matters about any course of action are its consequences."

But beyond the need for policy research which stresses consequences, rests the fact that by stressing consequences we are forced to conduct research along lines which traditionally have been considered scientific. It provides a vehicle for analyzing cause and effect relationships with quantitative data. It permits us to move out of the realm of opinion and toward the realm of fact. And because I think the failure to understand how to conduct rigorous research in public policy has been an important cause of the general failure to do this type of research in agriculture, I should like to outline the procedural steps in a research project which stresses the consequences of action:

(1) We must first choose the policy or program or action which is to be the focal point of the project. Probably we will choose this stimulus because it in some way affects us or affects the interests with which we are associated.
(2) We must know and be able to define the economic situation or milieu which is relevant to the action introduced, for it is the dimensions of this situation which will be changed or modified by the stimulus. If possible, the economic dimensions of the situation should be defined in quantitative terms, indicating, for example, quantity of product, income of operators, volume of employment, etc.
(3) We introduce a government action through the vehicle of a program to provide a stimulus and set in motion a sequence of events or interactions.
(4) We trace and describe the sequences of events or interactions which flow from the introduction of an economic stimulus in the form of a government program.
(5) To accomplish (4), we use economic and statistical concepts developed for other purposes, correlation analysis, sampling technique, demand functions, supply functions, time-preference concepts, theories of money and employment, and what-have-you.
(6) The point of all this is to discover who is affected by the economic stimulus, and to report how they are affected and to what extent.

This type of research is obviously not limited to economics or agricultural economics. It could, for example, be used just as well in a sociological or medical policy inquiry. It may be qualitative or quantitative in nature, recognizing, of course, that insofar as it is

quantitative in nature and permits measurement, it leaves less room for individual interpretation. In brief, a methodological process has been outlined, not an analytical procedure, and the analytical procedure will vary with the researcher and the problem. The thing to remember in all this is the basic idea of consequences—their discovery and measurement.

On a different level, this *type of analysis need not be limited to historical acts of policy*. We may want to concern ourselves with the probable consequences of an act that has not as yet been taken (e.g. over the past few years, several of us have tried to isolate and measure the economic consequences of a Food Allotment Program—a program which has not as yet been written into legislation). In assuming a policy action, we have for research purposes created a stimulus which has consequences. That is all we need to start an analysis. And insofar as we can postulate with concreteness the economic situation in which the stimulus is to be introduced, we can conduct an analysis using an assumed stimulus in a manner just as effective as with an historical one—the logic of the procedure is the same in either case.

The type of analysis under discussion here, and by inference strongly recommended, may or may not appear novel, depending in large measure on how much each of you may have considered the problems involved in doing policy research. But I should like to point out that there is a certain amount of orthodoxy in the process described. It has been used as a pedagogic device many times in the past. Alfred Marshall, you will remember, introduced in his analysis of rents a tax on hop production in one case, a tax on printing presses in another, and a tax on printing materials in still another. In each of these cases he traced the economic consequences on rents and quasi-rents that flowed from the introduction of the tax stimulus. Now I ask—why can't present day economists plying their trade in the field of agriculture employ the same general procedure?

IV.

It is impossible to discuss research in the economics of agriculture these days without some reference to the Research and Marketing Act of 1946. It overshadows all else on this topic. But where does research in public policy tie into the Research and Marketing

Act of 1946? I think there is a close tie between the subject of research in public policy and the Act. But first we need to look at the work going on currently under the provisions of the Act.[1]

The expanded research in marketing under the Act, although not exclusively under the direction of the Secretary of Agriculture, for some funds under Title I are designated for research in marketing in the States, is primarily under the direction of the Secretary of Agriculture in the Federal Government. In its research work in marketing, the Department of Agriculture is resisting pressure to make dramatic exposures of irregularities in the marketing system. The persons responsible for research in marketing in the Department do not feel that much is to be gained by limelighting examples of wide profit margins here and there, and thus imply that the entire marketing system may be operating along similar lines. Rather, the Department, in its research, is pursuing a tried and tested policy concerned with the *measurement* of marketing activities. It is trying to collect better information; it is trying to collect more timely information; and it is trying to organize marketing data in more meaningful ways and thus make available more precise, quantitative information about the marketing system. This, you will remember, in an earlier part of this paper, was pointed out to be the traditional role of government in research. This is what government prefers to do and what it does well.

Research in new and expanded uses for agricultural products has been taken away from the economists and given to the technologists in the regional laboratories. Since that ill-fated night in the fall of 1945 when the winners of the price-policy contest sponsored by this Association were unveiled to Congressional leaders, it seems Congress has lost faith in the ability of economists to find miraculous solutions to the problems of farm prices and surpluses. The prize-winning economists did not show themselves capable of finding ways and means of permitting agricultural interests to charge prices that they alone deem adequate and then make consumers take farm products at those prices. Thus the job of working miracles has been turned over to the technologists.

But the people responsible for research under Section 10 (a) into new and expanded uses of agricultural products are worried. They

[1] See the brochure recently released by the National Planning Association entitled *The Agricultural Research and Marketing Act of 1946–A Consideration of Basic Objectives and Procedures,*" for an informative review of the Act.

can see that the research along these lines may get into hot water, and soon, if the technologists are unable to come up with some revolutionary new uses. Now all of us know that food products, when considered in the aggregate, have an extremely inelastic demand. And certainly some of the commodities most likely to be in trouble (e.g. potatoes and wheat) have an inelastic demand. It is not easy to increase the demand for these products, and revolutionary new uses are hard to find for potatoes even in wartime. Thus, if and when prices begin to sag on some, if not all, agricultural commodities, and the great new uses hoped for have not materialized, Congress is very likely to feel that it has been cheated. And if reasonable and alternative policy solutions are not on exhibit, Congressional leaders may be inclined to feel that the Research and Marketing Act of 1946 was just another operation rat hole.

It is this clear directive in the Research and Marketing Act of 1946 which represents a danger zone for research workers in agriculture. It seeks a miraculous solution to surpluses, if and when they develop, but I for one don't think the miracle will happen. And failure in one part of the Act can easily reflect adversely on the other parts.

Title I of the Act provides additional funds for general research into the laws and principles of agriculture—the research to be carried on primarily under the auspices of the State Agricultural Experiment Stations. Here the directive is broad—broad enough to include the type of research in policy that we are discussing here without any stretching of the letter or spirit of the Act. But from the little I have observed, and I would be the first to admit that my observations have been casual, I would say that research in the States, as in the Federal Government, is proceeding along traditional lines. Except in rare cases research in public policy is playing no more important a role in State research programs under the New Act than it did before.

This development, or more properly lack of development, is unfortunate; for, as the National Planning Association has forcibly pointed out, Congress is expecting from all this research an income effect to the benefit of agriculture. But a large and significant income effect to the benefit of agriculture does not appear to be even a possibility, let alone a probability. To quote from the National Planning Association brochure:

"It is no derogation of the importance of research looking to the improve-

ment of marketing methods and organization to point out that more efficient marketing will not in itself make the difference between five-cent hogs and thirty-cent hogs, or between fifty-cent wheat and two-dollar wheat, or between eight-cent cotton and thirty-cent cotton. These differences in price have occurred under marketing techniques and organization that were essentially identical. The price of pork may be affected far more importantly by the level of industrial employment than by methods of marketing; that of wheat and cotton, by national and international trade policies than by the specific methods used in the selling of products."

What specifically can and should be done? I would argue that the administrators of the Research and Marketing Act in the United States Department of Agriculture should encourage and the administrators of research in the State Colleges of Agriculture should feel compelled to get underway policy research that deals with the basic income issues raised by the Act. I would suggest research projects in policy along the following lines:

(1) Research into the consequences of pursuing the current policy which seeks discovery and adoption of new and expanded uses of agricultural commodities if and when they should come into surplus.
(2) Research into the consequences of actions designed to shift agricultural resources away from the production of low-resource-using commodities into the production of high-resource-using commodities, e.g., from potatoes to butter.
(3) Research into the problems and consequences of expanding food consumption domestically in periods of low prices through the development and expansion of special consumption programs.
(4) Research into the consequences of expanding the consumption of agricultural commodities abroad during periods of low prices by mutually agreed upon export programs.
(5) Research into the consequences of pursuing a policy designed to shift human resources out of agricultural production and into nonfarm pursuits.

There may be other lines of policy research that could be named which would prove more fruitful. If so, let them be named and work on them be started. These are made simply as suggestions, not as a delineation of the field.

Who will do this important research in agricultural policy? We can assume, I believe, that Harvard, Chicago, and Brookings will continue their work on policy questions and perhaps even expand it somewhat. But it is to the State Colleges of Agriculture that we must look for a greatly expanded research program that deals with agricultural policy and its consequences. In the last analysis we must pin our hopes for an expanded program of policy research on

the individual researchers in the State Colleges of Agriculture; it is there that the human resources are available with the training, interest, and *relative* freedom necessary for this type of work.

But just in case there are any Federal administrators at these meetings or one should happen to read this paper, I should like to suggest that they give more consideration to policy research in connection with the Research and Marketing Act. I recognize the problems involved in doing policy research in the Federal Government; we have discussed some of them in this paper. But a sympathetic administrator who appreciates what can and cannot be done in this field could, with the funds at his disposal, get some important research work done on the vital policy issues at stake.

DISCUSSION*

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Professor Cochrane has done an excellent job of presenting a case for expanding research in the field of public policy. In addition to making an appeal for more research in public policy he suggests a methodology that can be followed.

Research in public policy is defined as *"that analytical work concerned with tracing the consequences of pursuing a given policy."* For this definition to be valid the assumption must be made that it is possible to isolate the different stimuli, and all the combinations of stimuli, that are created by public agencies in their pursuit of a given policy and to trace the economic consequences of a change in either an individual stimulus or any combination of stimuli. This is a worthy objective for research in public policy, but it is not easily attained. It is desirable as a goal which research workers should strive to attain but it should be pointed out that even with good research it is unlikely that we will be able to trace, in a purely objective fashion, the economic consequences of pursuing a given policy.

This statement is significant since an appeal is made by Professor Cochrane to avoid confusing informed opinion with research in public policy. The question that immediately presents itself is whether a sharp contrast between opinion writing and research in public policy exists. Results secured by either quantitative or qualitative research must be interpreted. The interpretation made will depend upon the assumptions used, and assumptions in the social sciences tend to be controversial in nature. Even though the research methodology used is excellent the research worker must use opinion. The value of the opinion frequently determines the quality of the research.

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To use a specific example; Hans Staehle in a study on "Relative Prices and Postwar Markets," *Quarterly Journal of Economics*, February, 1945, shows in a quantitative fashion that during 1933 and 1934 there was a change in consumer preference for beef in relation to pork. Staehle makes no effort to explain the reason for this rather large and abrupt shift in consumer preference. In tracing the economic consequences of certain types of public policies, research of this type would be extremely important, but the research worker would need to make the decision as to what was responsible for such a shift. Was the Corn-Hog program of the 1933 AAA and the emergency beef program conducted by the Federal Surplus Relief Corporation either wholly or partially responsible for this shift in consumer preference? If those programs were responsible, what proportion of this economic consequence was due to each stimulus? Unfortunately the social scientists have not been able to develop a methodology which will enable them to trace economic consequences in a purely objective fashion.

This is not to say that we cannot do valuable research in the field of public policy or that such research should not be purely objective whenever possible. Much more research needs to be done in the field of public policy. The Land-Grant Colleges should emphasize this type of research, but it must not be forgotten that research in this field usually is controversial, and if controversy is wholly avoided, not much can be accomplished.

Not all economists will agree with the suggestion that the Federal Government should conduct economic research that is primarily concerned with the measurement of economic phenomena. It is agreed that the federal agencies have performed a fine and valuable service in collecting, assembling, and refining statistical data. It also can be conceded that "this type of research activity avoids the nasty distribution implications of political significance so often associated with economic analysis and almost always associated with policy analysis." Why should research workers in the federal service be excused from doing research work that is controversial in nature? Research workers in the Federal Government service in some respects are in a much better position to do certain types of research in public policy than are personnel in the State Experiment Stations. If the federal government can be excused from doing this type of research, can administrators in certain Land-Grant Colleges be blamed for avoiding such research? I concur with Professor Cochrane's opinion that this type of research cannot be avoided by Land-Grant Colleges if they wish to be great and influential, but I also would add that it cannot justifiably be avoided by research workers in the Federal Service either.

There is no disagreement with the objective that research in public policy should emphasize the consequences of policy actions or with the methodology developed. It merely appears that the assumptions implied in outlining the procedural steps for a research project that stresses the consequences of action are difficult to grant in the present stage of development of research in the field of public policy. A few of these assumptions are: (1) That we can choose, isolate and control the different stimuli that are created by different types of public policy. (2) That we know and are able to define the economic situation or environment which is relevant to

the action introduced. (3) That we can trace and describe the sequences of events or interactions that flow from the introduction of an economic stimulus in the form of a government program. (4) That we can determine objectively who are affected by the economic stimulus, how they are affected and to what extent.

I am in almost complete agreement with the discussion of the Research and Marketing Act of 1946. If I add my observations to those of Professor Cochrane's, I must admit that research in the states conducted under this act is proceeding along traditional lines and that "research in public policy is playing no more important a role in State research programs under the New Act than it did before." This act offers an opportunity to do research work in public policy which may prove to be considerably more fruitful than much of our traditional research. Yet we are continuing to use these additional funds to do more research in fields for which other research funds are available. Research work in these fields is important, but it is not so important that all funds should be used for it and research in the field of public policy be excluded.

The individual researchers in the Land-Grant Colleges should make an appeal for using at least a portion of the funds available under Title I for doing research in public policy. Although research work in this field is controversial, I believe we can rely on objectivity, tact, good sense, and academic freedom to avoid any unusual difficulties.

STATISTICS AND RESEARCH IN THE FIELD OF PRICE ANALYSIS*

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1. *Development of Empirical Price Analysis*

THE use of statistics and research in the field of price analysis has become widespread over the past thirty years. Rapid progress has been made in the development of techniques. Yet several problems remain to be solved if dependable answers to economic questions are to be reached by this means. Before stating some of the objectives and problems of empirical price analysis, we might briefly review the historical developments in this field.

Cournot, in 1838, is credited as being one of the first to set down the "law of demand"—the consumption function—in precise language capable of statistical manipulation. " . . . the sales or the annual demand D is, for each article, a particular function $F(p)$ of the price p of such article. To know the form of this function would be to know what we call the *law of demand* or *of sales*." This concept was popularized by Alfred Marshall, and is known as the Cournot-Marshall law of demand.

Leon Walras in 1873 extended the static law of demand for a single commodity from dependence on its own price to dependence on prices of all commodities and services. Here the problem becomes one of mutual determination. The position of the demand curve for a given commodity will depend on the values assigned to the prices of the various other commodities and services. The Walrasian System expressing the law of demand may be inverted and expressed as the law of price. That is, the price of any given commodity may be expressed as a function of the quantities of all commodities and services produced or consumed.

Henry Moore beginning in 1914 pioneered in the use of time-series data to obtain statistical demand, price, and production functions for a number of commodities.[1] Shortly after, income was in-

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† Acknowledgment is made of useful suggestions and advice by colleagues in the Production and Marketing Administration and Bureau of Agricultural Economics, with particular indebtedness to Richard O. Been, B.A.E.

[1] *Economic Cycles: Their Law and Cause*, 1914; *Forecasting the Yield and Price of Cotton, 1917*.

troduced as a separate independent variable to help explain changes in demand and price. Henry Schultz credited Slutsky with this development. Moore's empirical work was followed in the 1920's and 1930's by a number of attempts to determine the demand function, the price function, and the production function for various commodities, using time-series data and least-square regression techniques. Henry Wallace, B. B. Smith, Haas, Ezekiel, L. H. Bean, Holbrook and Elmer Working, Henry Schultz, and several others were prominent in this field.

A landmark was reached in 1938 with the extensive studies of Henry Schultz published in his book *The Theory and Measurement of Demand.* Schultz explicitly introduced time as a variable in the demand function. He expressed the general dynamic law of demand for a given commodity or service as follows: $q_1=f(p_1, p_2, \cdots, p_n, E, t)$, where q_1 represents the quantity of the commodity or service purchased or consumed, $p_1, p_2, \cdots, p_n$ represent prices of the various commodities and services available to consumers, E represents net or disposable income of the community, and t represents time. This "general law" is still in use although later workers have introduced joint relationships, have made combinations of terms—particularly of the price variables—have deflated value terms by an index of the general price level, and have made numerous other transformations of the data preliminary to analysis. The form of function to be fitted—linear, curvilinear, logarithmic, and so on—leaves room for considerable ingenuity and testing on the part of the analyst.

Frisch in his confluence analysis and use of bunch maps approaches the problem of estimation in a somewhat different way from that of most analysts.[2] Frisch is particularly concerned with the question of selecting relevant variables before estimating relationships. Stone has made extensive applications of this method in the analysis of market demand for several commodities.[3]

Four tacit assumptions appear to underlie the use of least-square, single-equation, regression techniques in estimating the demand function. (1) There is a routine in the demand behavior of human beings in the market. (2) Statistical data of consumption, prices, and income reflect this routine of demand. (3) The unknown theo-

[2] *Statistical Confluence Analysis by Means of Complete Regression Systems,* Ragnar Frisch, Oslo, 1934.

[3] "The Analysis of Market Demand," Richard Stone, *Jour. Royal Stat. Soc.,* Vol. CVIII, Parts III–IV, 1945.

retical demand function can be approximated by various empirical curves which can be fitted to the observed data. (4) The routine of human behavior may change over time, but slowly, so that the demand function when approximated may be used for predicting future behavior at least for a short time. Similar assumptions appear to underlie the procedures followed in fitting price-quantity curves using concurrent data, and supply curves using lagged data as suggested by the cobweb theorem.[4]

Attempts were made by Pigou[5] and later by Marschak[6] to measure the price elasticity of demand by use of budgetary data. Those attempts, although viewed as successful by their authors, yielded income elasticities rather than price elasticities of demand. The budgetary method of analysis, as it has been used, shows a cross section in time of expenditures and consumption by income classes with little or no price variation. Nevertheless, budgetary studies, as conducted both in this country and abroad, have given fruitful results. Agricultural economists have been impressed by the fact that family expenditures for food tend to increase sharply from the very low income classes to the next, and tend to level off above the middle income groups. This finding has useful implications when we are dealing with national nutritional problems or with problems of agricultural surpluses. In connection with these same problems there is still a need for information on price elasticities of demand by income classes. It is presumed that prices have more influence on consumption, particularly for necessary foods, in the lower income groups than in the upper. But practically nothing is known of the relative influence of price on consumption in the different income groups. Repeated budgetary surveys of identical families, under variable price conditions, appear to offer the most promising means of obtaining such information.

Other approaches to the problem of empirical price analysis in recent years include the use of cyclical patterns, and the method of simple historical comparison to predict future price fluctuations. It is known that major cyclical peaks in prices are induced by wars,

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[4] "The Cobweb Theorem," Mordecai Ezekiel, *Quar. Jour. Econ.* LII, Feb. 1938, See Also Henry Schultz, 76–79.

[5] "A Method of Determining the Numerical Value of Elasticities of Demand," A. C. Pigou, *Econ. Jour.*, XX, 1910.

[6] *Elastizität der Nachfrage* ("Beiträge zur ökonomischen Theorie," No. 2) Jacob Marschak, Tübigen 1931.—Cited by Henry Schultz in *The Theory and Measurement of Demand*, 1938.

and hence are roughly predictable to the extent that wars are predictable. But the less spectacular cycles of interwar periods are distinctly lacking in regularity. Even the well-known hog production and price cycles can be easily upset by variations in weather or by changes in the general demand situation. Price predictions based on the repetition of cyclical patterns, involve the assumption of a rhythmic interaction between changes in production and prices. The more complex interrelations of economic forces, and unforseen changes of a non-economic character such as severe and widespread droughts, are largely ignored. Nor has the invention of long-term, middle-term, and short-term cycles occurring singly and in conjunction, served to explain commodity price fluctuations convincingly.

The method of historical comparison to predict price variations is in fairly wide usage. Many economists consciously or subconsciously tend to compare events in a current period with events in some previous period when the surrounding circumstances were similar. This method of comparison involves the use of judgment and is largely intuitive. The results are surprisingly accurate at times. Nevertheless, the method lacks scientific basis, and is valuable chiefly as a stop-gap until more reliable methods of analysis are developed.

A serious attempt is being made by the Cowles Commission to develop structural systems of equations whereby, with the use of time-series data, it would be possible to determine the parameters of all important economic forces in the structures. Structural systems are not entirely new. The demand equation developed by Walras was essentially a structural system in that it involved the prices of all commodities and services. Others to suggest structural systems include Lenotief[7] and Tinbergen.[8] The structural systems and estimating methods being developed by the Cowles Commission were suggested by Haavelmo in 1943.[9] These systems are novel in that random shifts are assumed for each of the equations, and in that all the equations are assumed to be mutually dependent, requiring simultaneous solution. These assumptions rule out the

[7] *The Structure of American Economy*, 1919–1929, Wassily W. Leontief, Harvard University Press, 1941.

[8] *Statistical Testing of Business Cycle Theories*, J. Tinbergen, in two parts, League of Nations, Geneva, 1939.

[9] "The Statistical Implications of a System of Simultaneous Economic Equations," Trygve Haavelmo, *Econometrica*, Jan. 1943.

possibility of using least-square, single-equation regression techniques. A new method of statistical estimation, using time-series data, was developed, largely by Haavelmo, Koopmans, Anderson, Rubin, and Girschick.[10] The structural system, according to its authors, is designed to explain the structure of the economic system as it exists, and to give the "true" coefficients of elasticity, having in mind that most if not all of the economic forces at work are interdependent in nature. Prediction is achieved, in this system in the sense that if one or more of the economic variables is fixed or controlled, the effect of such action on all the parameters of the system can be calculated; that is, the change in the whole economic structure can be foretold.

2. *Objectives of Price Analysis*

Prediction is used in science in two ways: first to test hypotheses; second to apply accepted hypotheses or theories to specific situations for specific answers. These procedures can be illustrated in countless ways in the natural sciences.

In the field of price analysis our first objective is, or should be, the formulation of hypotheses which are capable of proof or disproof by the use of empirical data. Too frequently in economic theory the hypotheses are expressed in such general, abstract, or complex terms that it is impossible to devise empirical tests for them. Fortunately there appears to be a growing tendency to express economic theories in terms that may be reduced to manageable statistical forms. This tendency certainly should be encouraged. Otherwise, our tests of economic theory remain perpetually in the realm of logical reasoning and polemics.

With economic theory as it now exists, it is possible to employ statistics and research to obtain specific answers to many specific questions that arise in agriculture and industry. A basic objective of price analysis is to derive knowledge about economic relationships that will be useful in current problems of planning and prediction. To obtain this knowledge we need to make accurate statis-

[10] Haavelmo, previous citation; also, "The Probability Approach in Economics," Supplement to *Econometrica*, Vol. 12, 1944; "Statistical Estimation of Simultaneous Economic Relations," Tjalling Koopmans, *Jour. Am. Stat. Assn.*, Dec. 1945; "Estimation of the Parameters of a Single Stochastic Difference Equation in a Complete System," T. W. Anderson and H. Rubin, announced for publication in *The Annals of Mathematical Statistics;* "Statistical Analysis of the Demand for Food: Examples of Simultaneous Estimation of Structural Equations," T. Haavelmo and M. A. Girschick, *Econometrica*, Apr. 1947.

tical analyses of the production, price, and consumption functions with allowance for the interrelations among commodities and the effects of substitution. We also need other kinds of information. We need to study price margins and costs in processing and distributing agricultural products. We need to know more than we do about the structure of prices both in space and time. Important work can be done in studying geographical price relationships and the influence of such relationships on market movements. We also need to know more about the timing of price changes in relation to inventories and sales at different levels of the marketing system. With better understanding of such relationships, and more and better published information available, it might be possible for businessmen to avoid some of the wide speculative swings in prices that are characteristic of certain commodities. And for some commodities at least, intensive study is needed with regard to the problem of spreading the market price risk through widening the extent of ownership either of the physically stored commodity or through the holding of futures contracts.

Special problems and questions of policy frequently arise which require analytical solution. The imposition of a processing tax, for example, tends to increase the total marketing charge. It is important to know on whom the burden will fall most heavily, the producer or the consumer. The same problem, in reverse, is involved when the question of subsidies to processors arises. Other changes in marketing charges, such as increased transportation rates, may be analyzed by known techniques provided reliable supply and demand curves can be derived from the historical data at hand. Similarly, it is possible to measure the incidence of a tariff or of an import quota on domestic and foreign prices. It is also possible to evaluate the influence of changes in foreign supply or demand on domestic prices of an export commodity by use of statistics and research.

3. *Current Problems in Price Analysis*

Attempts to obtain solutions for such problems are constantly being made by the price analyst. However, there are certain obstacles to the complete and satisfactory fulfillment of the analyst's objectives. These obstacles may be listed under four headings, which are given here in order of increasing importance.

First, there is the problem of obtaining adequate statistical data.

Despite the mass of statistics already available, practically every price analyst has been confronted with the lack of sufficient or reliable data to make a complete analysis. For example, the measurement of price elasticity of demand by family-income levels is virtually impossible at present because of lack of family-expenditure data taken on a comparable basis over a period of time and under variable price conditions. Detailed analyses of marketing margins and of market price structures, commodity by commodity, are extremely difficult because of the paucity of representative and accurate data on prices, inventories, and sales at each of the stages in the marketing system. And frequantly there is an unfilled need for representative price information by specified descriptions of the commodity such as grade, size and origin.

Basic data are the foundation stones of research programs in prices and related fields. Dependence on time-series data mean that in many cases acceptable analysis must await data accumulation over a period of many years. For this reason, the early stages of most long-range research programs should be given over to the problem of primary-data requirements, and where adequate data are not available, immediate steps should be taken to provide for their collection.

Second, in any study involving price interrelationships the analyst is confronted with the problem of intercorrelation among variables. A system as complex as the Walrasian or that of Henry Schultz in its general form probably is statistically indeterminate because of the large amount of intercorrelation present. Fortunately, statistical devices such as combining price terms and deflating price, cost, and value terms permit the research worker to handle such problems without great loss of precision. This type of solution is not always applicable, however, and the research worker must always be on guard to detect spurious results arising from intercorrelations among the various series of data. Frisch has considered this problem in detail in his work on confluence analysis. In the usual type of analysis intercorrelation may result in serious loss in the meaning of the coefficients of error, leading to misinterpretation of the results.

Third, and perhaps a more fundamental difficulty, is the problem of independence of successive observations within individual time series. The enthusiasm with which price analysis was conducted during the 1920's and early 1930's waned rapidly when many of the

predictions proved to be far wrong; and when, in addition, the importance of error probabilities began to be generally recognized. Although some confidence has been regained in statistical research with recognition of the expected degree of accuracy, there is still a serious question as to how far the price analyst can go in producing dependable results. Serial correlation is considered by some analysts to be important only if it shows up in the final residuals. Others regard it as a serious obstacle if it occurs in the primary data. More work needs to be done to demonstrate which of these two views is correct. If it is the latter, we may apply Bartels' criterion for measuring the independence of data.[11] Some applications of Bartels' criterion have shown that for certain agricultural price and production series an average of 3 or 4 years of data may be necessary to yield a single independent observation. Suppose, we have a multiple correlation problem with 4 variables and 21 years of data. Usually with linear equations we would consider that we had 17 degrees of freedom. However, if on testing each of the time series for independence of data we found it necessary to combine every 3 observations to give the equivalent of one independent observation, the total number of independent observations would be reduced to 7, and the total degrees of freedom would be 3. This may explain why so many of our correlations, which appear to meet the usual tests of significance, prove to be undependable for prediction purposes. And if the problem is difficult for single-equation systems of 3 to 5 variables, it is almost hopeless of solution in structural systems employing 10 to 20 variables unless we can obtain economic time-series data covering many more years of observation than are normally available.

If these first three problems could be solved successfully, we could obtain good measures of interrelationships and elasticities. However, if we are concerned with price prediction, in time, we are confronted with a fourth difficulty in the field of commodity price analysis. This difficulty arises from the fact that no one as yet has put forward a completely trustworthy theory of changes in

[11] Bartels' criterion requires comparison of twice the variance of the observed time series with the variance of the first differences. If the series were random the ratio would be approximately one. A larger ratio indicates serial correlation, and the value of the ratio—2, 3, and so on—indicates the approximate number of observations equivalent to one degree of freedom.—Attributed to J. Bartels, a German Meteorologist. For an interesting discussion of other aspects of serial correlation see also M. S. Bartlett, "Some Aspects of Time-Correlation Problem in Regard to Tests of Significance," *Jour. Roy. Stat. Soc.*, Vol. 98, III, 1935.

the general price level. It is possible, within the limitations just mentioned, to explain prices of individual commodities and services in terms of the general price level, or in terms of the national income which varies in large part with changes in the general price level. But in making a prediction of a future price for a single commodity or group of commodities the analyst is forced to make an assumption as to the probable level of the general demand factor used. Obviously the price prediction is no better than the assumption made. Moreover, if we add up the results of all individual price analyses made with reference to an assumed position of the general price level we will find that we have explained price in terms of itself. Many economists have wrestled with the problem of explaining variations in the general price level and related cycles in business activity. As perhaps the number one problem in the field of price analysis, intensified effort should be made to solve it both by the theorist and the price analyst using statistical research methods.

In conclusion, it might be argued that the obstacles to statistical price analysis are so severe that little reliance should be placed on this type of activity. However, I do not think this to be the case. It is true that we are on dead center so far as some of the problems are concerned, particularly with reference to making accurate predictions of prices in the future. But if the next thirty years should prove as fruitful of results as the past thirty, we shall have gone a long way toward overcoming the obstacles that now seem important.

DISCUSSION*

HARLOW W. HALVORSON
University of Wisconsin

I had expected that Mr. Walsh would approach this discussion on a somewhat broader basis. His discussion has centered primarily on the problems involved in the usual sort of aggregative analysis of agricultural prices—and I think he has done a good job of summarizing the statistical problems in this field. This is, indeed, a very important part of price research.

But I feel sure that another aspect of price research should be given increasing attention—namely that of concentrating further work on narrower segments of the field and of developing some of the sorts of research mentioned by Nichols in his recent article on "Marketing and Price Re-

* A discussion at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

search" in the *Journal of Farm Economics*. For various reasons I believe substantial results will be achieved by focusing much more attention on these sorts of studies. Effective use of market research funds requires better coordination of marketing and price research. It is true that many of the techniques mentioned by Walsh can be applied in this direction. In addition, it is probable that techniques of experimental design developed by our friends in agronomy and psychology will find a useful role in analyzing some of these problems. Furthermore, the testing of recently developed economic hypotheses in this field should offer fruitful possibilities and lead to further elaboration of theory.

I mention this point to dispel the impression that developed in my mind that statistics and price research would not do more than just continue the same sort of aggregative studies on which, except for minor reference, Walsh concentrated his attention.

A comment of similar nature might be made about the useful role the field of sampling theory can play in analyzing price problems.

In terms of its significance as a factor in explaining the fluctuations in most farm prices the importance of price level movements has long been recognized. Walsh does well in emphasizing the need for techniques and theory to forecast better the movements of price levels. Perhaps coordination of economic theory with other disciplines will help us move forward on this front.

Lack of adequate statistical data has always been an important limiting factor in price research. Data collected for other purposes probably will never be completely satisfactory raw material for price research, and judicious interpretation of results of price analyses will always bear this in mind. Consequently the emphasis given by Walsh to data-needs in long-range research programs as well as elsewhere is well taken.

I am somewhat concerned over Walsh's point that theory should be simplified so that it may be tested statistically. While much theory may be overly complex, it is true that simple continuous relationships are not characteristic of modern economic life. It seems to me that this is less a need than for developing better statistical techniques which are more flexible and which can better test more complex but more realistic theories. This, it seems to me, is one of the important contributions of Haavelmo and the Cowles Commission.

Having been a member of the B.A.E., I am somewhat surprised that Mr. Walsh has failed to pay his respects to the graphic correlation procedures which played such a large part in Bureau price research. Certainly from the standpoint of rough and preliminary investigations of price relationships this process has been a most valuable statistical tool.

One of the major limitations in statistical interpretation of economic relationships lies in the failure of the human universe to stay put—plus the fact that this universe is a complex one composed of widely different classes of elements. Tests of significance may be more accurately evaluated by considerations of serial correlation, but this seems to me to be essentially a negative approach to the problem. But I can't say that I can see a good alternative to it.

Another limitation has to do with the varying time lags by which people respond to the repetition of a given stimulus. Another has to do with the measurement of expectations. These sorts of considerations require careful interpretation of the data.

Allied with this matter of the failure of relationships to remain constant for long is the important problem of somehow recognizing as early as possible when these changes are developing. When does a given deviation from an average relationship represent (a) error in data, (b) random fluctuation, or (c) the beginning of a changing relationship? Looking backward in time, an answer to this question may in some cases seem obvious. But foresight is a different matter. The sharpening of our statistical tools and collection of more accurate and appropriate data should go a long way in calling the turn much sooner than we have been able to in the past.

TEACHING METHODS

Chairman: O. R. Johnson, University of Missouri

COORDINATING FUNCTIONAL AND DESCRIPTIVE MATERIAL IN TEACHING MARKETING*

AUBREY J. BROWN
University of Kentucky

ANY study of teaching methods for the general course in Agricultural Marketing must logically start with the objectives of such a course in the curriculum. It is to be expected that the objectives for this course are more nearly alike in the various universities and colleges than are the teaching methods used in meeting the objectives.

The objectives of the general marketing course are conditioned by several considerations. Whether or not the course is required of all agricultural students has a direct bearing on its aims. Also important are the number and scope of economic courses prerequisite to the general course, and in this respect considerable variation exists among universities. Of 31 states reporting on a questionnaire[1] prepared for this session, 19 states required economic prerequisites and 12 did not. Five of the 19 states specifying prerequisites indicated a requirement of 3 semester hours in economics, 8 states required more than 5, and the average for the 19 was 5.7 semester hours. Another factor influencing objectives is the number and scope of allied courses in marketing and prices in the curriculum. Rather wide variations in this factor likely prevail among the states. Also of some probable influence on the objectives is the variation among states as to the occupations chosen by agricultural students after graduation. While these factors are of influence on the objectives of the course, several also have a direct bearing on teaching methods.

It is likely that only a minority of agricultural students taking the general marketing courses also take other marketing courses. If that is correct, the knowledge gained by the majority of the students about agricultural marketing is received from the subject matter in the general course. Most students entering this course in

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

[1] Prepared and summarized by O. R. Johnson, University of Missouri.

the junior or senior year have had little systematic understanding of marketing, and further, their course work has been weighted heavily by study in the production courses. It would seem to me that under these conditions the basic course in marketing should be directed primarily toward subject matter of value to the general run of the students, and the course should stand more or less independent of the rest of the marketing curriculum. If adjustments have to be made to avoid too much duplication, let them occur in the other courses in marketing and prices.

What then should be the objective of the general marketing course?[2] My answer is rather broad—to provide students with an understanding of the importance, significance, and operation of the economic system that transfers farm products into commodities available for purchase by consumers.

Should we strive to attain these aims through the primarily descriptive or the primarily analytical method? The answer to this question is far from simple, for many factors need to be weighed. Certain rather constant conditions prevail at most universities. Important among this group that have a bearing upon the answer to the question are the following: (1) students in the general course are mostly from farms and their background has afforded them little economic training; (2) the interest of the agricultural student is in the practical application of economics, and (3) the diversity of economic principles in marketing adds difficulty to analytical study of the subject matter. Certain variable conditions also influence the decision as to teaching this course at the different universities. Among these are: (1) the previous economic study of the student when entering the marketing course; (2) the policy of departmental unity; and (3) the status of marketing research at the given university. The question is therefore not solely "Which is the better method?" but it is also "Which is best adapted to the conditions prevailing at the particular university?"

To attain the stated objective no one of the so-called approaches can be used alone. The commodity approach, mostly descriptive, integrates the system and can well be used for several important farm products of the state to illustrate the related aspects of market-

[2] Attention is called to the papers on the general theme of Teaching Agricultural Marketing given at the joint session of the American Farm Economic Association and the National Association of Marketing Officials, December, 1931. These papers are published in the *Proceedings of the National Association of Marketing Officials on Marketing in Practice, in Research, in Training.*

ing. In our course we consider livestock, tobacco, grains, and milk and milk products. We usually precede this part of the course with brief discussions of economic geography and the demand for and the supply of farm products. One major difficulty in using the commodity approach early in the course is the lack of understanding by the students of many of the marketing terms used in the textual material. This part of the course, using the commodity approach, can become repetitious unless watched carefully. Essentially what we try to do is to enumerate the characteristics of the commodity as a base and develop the flow of the commodity through the markets, giving some attention to types of buyers and sellers involved. Emphasis is given to the basic differences in the marketing systems for the several products and the causes of those differences.

Once the student has gained some understanding of the integration of the systems for each of several major products, we move on to the functional approach. Such a method of study provides a simple means of breaking down a complex subject and permits application of economic principles to the development of the subject matter. Certain shortcomings of this approach are realized—most of the illustrative textual material is for the grains or fruits and vegetables, certain of the functions are hard to separate (perhaps they should be handled together), and it is difficult to make this approach as interesting as is desired.

There remain certain important phases of agricultural marketing in a general course that can be given more emphasis if they are handled outside either the commodity or functional approach. Study of costs and efficiency in marketing, cooperative marketing, and prices related to marketing are in this category.

Certainly the first named is one of the most important contributions of the course, remembering that most students likely will not take other marketing courses. Study of efficiency in organization provides concreteness to the course that helps to balance the great amount of description in other parts of the course.

How far to go in the study of cooperative marketing, or agricultural cooperation in the broader sense, in the general marketing course likely varies widely from state to state. In certain sections of the United States where cooperative development has lagged, the importance of an objective survey of this aspect of marketing cannot be passed over lightly in the required general marketing course.

In the study of prices, the geography of prices, and day-to-day changes in prices, fit well in the general marketing course. Study of seasonal patterns of prices for a few major products of the state also emphasizes the importance of timing the marketing of these products from the farm.

The course sketched above is not in any sense suggested as a model. It was presented to indicate how the different approaches to marketing can be coordinated and how we have tried to arrange our course to meet the named objectives. Certainly the dangers in handling the course in this way should be pointed out. Most serious is the difficulty of coordinating the different aspects of the course so as to avoid confusing the students. Another danger is the presentation of too much material, reducing the effectiveness of the assignments and discouraging some of the students. We try to gauge how well the students are assimilating the material by giving short weekly examinations and by occasional class discussion.

Handling the subject matter in this manner gives the students a broad understanding of marketing of agricultural products usable in farming or in other occupations related to agriculture. This type of a course also provides a base for the following marketing courses where the problem method is better adapted and where the student has the background to handle the analytical method of teaching satisfactorily.

THE PLACE OF LECTURES, RECITATIONS AND LABORATORY WORK IN PRESENTING SUBJECT MATTER IN INTRODUCTORY MARKETING*

BEN F. ALVORD
Alabama Polytechnic Institute

IF REPLIES to Prof. O. R. Johnson's questionnaire index accurately the time allotted to lectures in introductory courses, in Marketing, then about half of the time is so used.

The introductory course usually aims to acquaint the student with the general marketing principles, functions, and procedures applying to principal farm products. These are usually described in more or less standardized ways in various text books. The order of description and the approach may vary somewhat, but they usually sift out finally in rather standardized form. It is vitally important that the beginning student understand these principles, functions, and procedures. However, students do not usually find them particularly difficult to understand and the situation does not tend to seriously challenge the ability of the instructor in presentation of his material. Thus, the situation smoothes the road for a dry lecture essentially repeating the text—presented materials. If this occurs, one might expect that the mentally inert student will not awaken, that the prepared student will note the repetition and turn his attention elsewhere, while the alert unprepared student may jot down key points which will give him at least a pass without having read the text and worse, perhaps without bothering to seriously question what the course is about. In my opinion the situation is more likely to occur in a beginning marketing course than in other agricultural economic courses where the lecture method is used.

The remedies that instructors use appear to be many. Concrete illustrations that touch the experience of the members of the class are brought in, personal experience of class members are solicited; hypothetical cases are set up to fit the current topic; problems are evolved for class solution, informal discussion periods are inserted, and various other means are employed. Perhaps 50 per cent or even more of the class time can be devoted to lectures. The lecture certainly enables one instructor to reach, at least after a fashion, a

* A paper given at the Annual Meeting of the American Farm Economic Association, Green Lake, Wisconsin, September 16, 1948.

large number of students with minimum expenditure of time and money, but this dry method to be reasonably effective, must be "moistened" frequently with well chosen breaks from text book material such as are mentioned above. In my opinion the lecture can bring very good returns per dollar expended but those returns depend very much on good management of the lecture.

Recitations or discussions appear to occupy less than half of the classroom time, according to Prof. Johnson's survey. The purposes of "recitations" are many, but at least 3 seem worthy of special note. The first is to be sure the student is so well drilled that he can hand back in tests what the text and the instructor presented him. Perhaps this purpose is worthy when uniformity is essential, such as, when problems are to be worked and specific types of illustrative figures are to be presented. But in general this purpose as such is more fitted to grade and high school days than to college. A second purpose may to be "sample" the class to see if they understand the material being covered. "Recitations" for this purpose undoubtedly have a valuable place, but the time consumed should be held to the minimum required to fulfill the purpose. Finally, recitations may make or "drive" home points. These may be built on leading questions and realistic illustrations. For this purpose wise choice of questions and choice of students to which questions are put are essential to economy of time in making the points. However, assuming the points are difficult and the questions and students are wisely chosen, this procedure may be used very effectively. Other purposes of recitations include interest promotion, tieing the student more closely into the course, and encouragement of real contributions on the part of the student to the course.

The results of Prof. Johnson's survey indicate that teachers of marketing usually use some so-called "laboratory" work to aid them in "putting across" their material.

This laboratory work usually takes one or more of 3 forms. About thirty percent scheduled regular laboratory periods varying from 1 to 3 hours. The nature of the work in these periods was unspecified. About the same number use one or more field trips as part or all of their laboratory work. About three-fourths require from one to 12 or more written reports as part or all of the laboratory work.

The variety in lecture, recitation, and laboratory requirements undoubtedly reflects largely three important variables, namely, the specific functions of the marketing course offered, the availability

of laboratory material, and the varying personalities of instructors.

Some beginning courses serve to briefly introduce marketing and are consistently followed by other courses in marketing. Some individual beginning courses are made up as more or less "complete presentations of the marketing subject." In such instances the subject matter is heavy and credit assigned is relatively large. Some introductory courses are developed without prerequisites of any kind and some are offered only to students who have had one or more economic courses. Some may deal largely with crops because other supplemental courses cover livestock and livestock products. Some may deal largely with livestock, while supplemental courses cover crops. All of these variations lead to variability in treatment.

Then, too, some colleges are located in great market centers where opportunities for educational field trips to wholesalers, manufacturers, buyers, etc. are numerous and travel costs are low. Others are in relatively isolated areas and offer little opportunity to observe without considerable expense anything except the relatively simple country market.

Finally, instructors gradually build their marketing courses around their own personalities, experiences and "biases."

In my opinion, rigid standardization of procedure and hours in lecture, in recitation, discussion and in laboratory is an impossibility so far as beginning marketing is concerned. There must always be something that is continually being "cut and tried" in the course or it may become very soon a "cut and dried" course presenting certain valuable principles but being woefully weak on inspiration.

UTILIZATION OF ILLUSTRATIVE MATERIAL, FIELD TRIPS AND OTHER AIDS IN TEACHING MARKETING*

C. G. McBRIDE
Ohio State University

BEFORE discussing the problem of teaching aids to which I have been assigned, it may be well to state briefly what we have as objectives for our marketing courses. Our students come to these courses with a background of ten quarter hours of general economics and five quarter hours of agricultural economics. We assume that they have the economic principles underlying the marketing of farm products fairly well in mind.

We aim to introduce them to the various agencies concerned in the functions of marketing farm products and purchasing farm supplies. We believe that good illustrative material is as essential in a marketing course as in any of the production courses.

One of our first moves is to try to put the student into a sort of atmosphere or environment of marketing. We require that he subscribe for a trade paper. For the general course in marketing farm products, most of our students choose the *Chicago Drovers Journal* but it may be one of the *Packers* or any other good market paper. Once a week we devote a full class period to the current market news. We try to create in the student the same sort of interest in daily market news that he might have in the comics, sports, or politics. We believe that to create such a reading habit market news must have continuous attention throughout the entire course. Each student is required to chart from week to week the price of one or more agricultural commodities.

Another exercise designed to demand careful reading is the collection of advertisements designed to illustrate both the sale and the purchase of farm products and farm supplies individually and through cooperatives.

We have a requirement that where a course is open to both undergraduates and graduates, the graduate student is assigned extra work. This may turn out to be an opportunity for a demonstration by the graduate of some phase of his research. A good example was a study of pre-packaging fruits and vegetables in which the

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student showed a film of store pictures and brought to the class several actual examples of pre-packaged vegetables.

With us the field trip has top rating, and it appears to enjoy the same high favor from students. While the trade paper helps to put the student into an "atmosphere of marketing," the field trip if well organized teaches him to "know his way around" among marketing agencies.

To reach its highest value there must be (1) a preview in the class room to give students some idea of what they are supposed to see, (2) an itinerary carefully prepared in advance giving exact addresses of places to be visited and names of persons who will receive the class on the visit, (3) close and courteous attention of the students at all times, (4) a comprehensive and detailed report from each student, including observations en route. This report receives heavy weighting in making up the course grades.

Our field trip for the general course in farm marketing has been run into Chicago with but one or two exceptions. Buses are generally used although we have at times used the railroad, private cars, and last year we had a bus and two U-drive-it cars. We leave Columbus, Sunday morning, spend all of Monday and until about 2:00 P.M. Tuesday in the markets arriving in Columbus around midnight on Tuesday.

In my opinion it is important to emphasize the personnel as well as the physical side of the places visited. The mimeographed itinerary carries the full name of every person we expect to meet. The students are expected in the trip report to evaluate these people as well as the marketing operations. My Chicago trip comes in the fall, and each person who helped in our visits not only receives a letter of thanks from our office a few days after the trip but at Christmas time he gets a greeting on a special Christmas letterhead signed by all members of the class.

Field trips for the single commodity marketing course in fruits and vegetables, livestock and dairy products are taken to cities other than Chicago. The class in fruit and vegetable marketing this year went to New York City and Washington. In the dairy marketing course the trip is confined to markets within the state.

These trips are required of all students. In order to obtain tax exemption on transportation a laboratory fee is collected at the beginning of the quarter by the bursar and we cover travel and hotel

bills by requisition. Last year this fee was not allowed as college expense for students under the G. I. Bill.

It has been our practice to make limited use of persons outside to the university staff for lectures. Until recently we had each year someone from the Chicago Board of Trade. Other organizations fhat have cooperated with us have been the Ohio Farm Bureau Cooperative Association, The American Dairy Association, The Ohio Retail Merchants Association, The Ohio Guernsey Breeders Association, The Ohio Livestock Producers Association.

Our decision with respect to the use of any of the aids discussed above is based upon our feeling as to their value in bringing vitality into the course. In most cases these aids do not make teaching easier. Often as in the case of field trips they involve a great amount of extra work. If, however, they bring what we are trying to teach into sharper focus they are worth while. When busy men from outside are brought in to meet a class, it is as important that they feel it has been worth while as that the students feel so.